Lake Colac Perimeter Path

Feasibility Study Report

March 2026

Colac Otway SHIRE

MICHAEL SMITH & ASSOCIATES
LANDSCAPE ARCHITECTURE AND URBAN DESIGN

We respectfully acknowledge the Gulidjan and Gadubanud peoples as the traditional owners of the Colac Otway region. We pay our respect to their Elders past, present and emerging. We acknowledge and uphold their continuing relationship to this land.

Prepared by:

Michael Smith and Associates
Landscape Architecture and Urban Design

Office: 1st Floor, 407 Whitehorse Road, Balwyn, 3103
Postal: 5 Jervis Street, Camberwell, 3124
Tel: (03) 9830 0414
Mobile: 0418 172 863
Fax: (03) 9830 2555
Email: mike@msalandurb.com.au

In conjunction with the following specialist sub consultants:

ASR Research
Community and Recreation Facility Planning
Suite 7, 321 Chapel Street
Prahran, 3181

Andrew Long Associates
Cultural Heritage Consultants
54-58 Smith Street,
Collingwood, 3006
Practical Ecology

OPS Engineers
Civil and Structural Engineers
137 Burnley Street,
Richmond, 3121

Practical Ecology
Ecological Restoration and Land Management Consulting
2B Scott Street,
Preston, 3072

Harlock Consulting
Quantity Surveying
Level 2, 420 Collins Street
Melbourne, 3000

Report Issue: Revision A - For Public Consultation 22.07.2024

ACKNOWLEDGMENTS:
Council Staff
Mr. Jarrod Woff – Acting Manager Connected Communities
Ms. Tamzin McLennan – Manager Connected Communities
Ms. Nicole Frampton – Recreation and Open Space Coordinator
Ms. Paula Gardiner – Acting Manager Assets and Project Delivery
Ms. Sarah Osborne – Communication Officer
Mr. Peter Macdonald – Strategic Community Engagement Coordinator
Ms. Suzanne Barker – Strategic Planner
Ms. Erin Sonego – Strategic Planner
Mr. Doug McNeill – Manager Planning and Strategic Focus

Barwon Water Staff
Kate Vallence – Strategic Engagement, Water Efficiency and Education Lead
Jacinta Burke – Senior Community Education Adviser
Damian McMurrich – Otway Treatment Coordinator

Parks Victoria staff - Travis Riches, Andrew McKinnon, James Gorman
Eastern Maar Aboriginal Corporation - Brodie Hamilton, Nathalia Guimarea
Property owners surrounding the lake for sharing their views.

Colac Otway SHIRE

Version March 2026: Yellow highlighting deleted

EXECUTIVE SUMMARY

For many years both the Colac Otway Shire Council and the wider community has harboured ambitions to construct a shared path around the perimeter of Lake Colac to capture the active and passive recreation opportunities, as well as tourism and event opportunities such a path may provide. In 2022, the Colac Otway Shire Council engaged Michael Smith and Associates to conduct a feasibility study into a perimeter path around Lake Colac.

Aim and objectives of the Lake Colac Perimeter Path Feasibility Study

The aim of the study was to:

- Determine the feasibility of establishing a shared path of 2.5 metres width to the foreshore edge around the perimeter of Lake Colac and identify any significant opportunities and benefits including barriers, issues or constraints.

The objectives were to:

- Determine the social, economic, and environmental opportunities/benefits of developing a shared path. This includes impacts and benefits to towns, localities and landmarks that would be linked via a proposed path.
- Consider the potential issues, barriers, and constraints associated with developing the proposed shared path.
- Understand the potential demand for a shared perimeter path, including target market/s, proposed uses, experiences and resultant visitation to the area particularly in light of the other existing and proposed quality trails in the region.
- The strategic alignment for the development of paths including policy, strategic land use planning and literature support.
- Determine the level of support for developing the proposed shared path including from community partners, landowners, tourism and business sector, and government.
- Determine and map an indicative path alignment that has community, government, Traditional Owner Group, and private landowner support.
- Estimate the capital cost, ongoing maintenance and staff management/resourcing required for the proposed path, including identification of possible funding sources.
- Identify responsible authority approvals and consents and land management agreements and/or acquisitions required, including private negotiations.
- Should the full path, or sections thereof, be considered feasible, establish an implementation plan with priority areas for action.

Assumptions and principles

Council instructed that this feasibility study be informed by and underpinned by the following assumptions and principles:

- Any path extension would be delivered in stages.
- The priority extension would be to the west of Colac to join the new estate/growth areas in the west up to the current path network.

- The path be constructed to a shared path standard (Infrastructure Design Manual sets out – 2.5 metres minimum wide concrete path, however for this project a 2.5 metre wide gravel path will be allowed for in rural areas), in order to cater for pedestrians and cyclists. If there are sections where site constraints make construction of 2.5-3 metres difficult/unviable due to path width, a reduction to the path width can be considered.
- The path design will maximise ease of ongoing maintenance and the ability to use machines (e.g., ride-on mowers and slashers) across the entire network.
- The path design will seek to present the most affordable capital options where possible (subject to limitations).
- The abutting landowner's right not to support the construction of a path on their property will be respected and alternatives will be explored.
- Protection of cultural heritage and the environment will be a priority at all times in planning and/or implementing path extensions.
- Planning will consider all-abilities access, where practicable, and make recommendations accordingly.
- Opportunities to link path extensions to existing footpath and road networks for the creation of loops will be explored.

Key findings and conclusions

The key findings and conclusions of the lake path feasibility study are as follows:

- Lake Colac has generally been regarded as being an under-utilised asset that has the potential to provide greater social networks, recreation and exercise, including economic and tourism benefits. In the future planning and detailed design process, an economic assessment including a cost benefit analysis will be required.
- The Colac community has advocated for the extension of the lake perimeter path for the past 20 years. The Cororooke community located several kilometres to the north-west edge of the lake has also advocated for a walking and cycling trail around the perimeter of the lake as a link to the Cororooke hamlet. This long-standing advocacy reflects strong interest in improving access and connectivity around the lake. Recently, there have been some private and public visitor infrastructure improvements to activate the hamlet. These include a café, a theatre/cinema at the former church and four outdoor sports courts, a playspace and picnic area as public open space.
- The proposed perimeter path aligns with key strategic planning documents, including the Colac 2050 Growth Plan, the Lake Colac Foreshore Master Plan and the Management Plan prepared by MacroPlan (2002). These three plans endorse the development of a full walking and cycling loop around Lake Colac, reinforcing the project's policy relevance and long-term vision. For instance, the Colac 2050 Growth Plan identified Lake Colac as an important environmental, cultural heritage, aesthetic and recreational resource.
- The existing path network, future improvement to it and future extension of the path network including the community's desire for a perimeter path around the lake has been well documented in Council's Lake Colac Foreshore Master Plan 2016-2026.
- Aboriginal and European heritage and history is evident, the lower reaches of Deans Creek are particularly rich in Aboriginal sensitive artefacts and sites. Further studies will be required if Council proceeds with detailed path investigations, and these are likely to reveal additional Aboriginal cultural heritage values which must be protected as a priority, as required under the Aboriginal Heritage Act 2006.

- There is a total of thirty-eight (38) properties that front onto the lake that do not have an existing path adjoining their property. During the study, contact was made with most of the property owners with foreshore frontages to the lake, totalling thirty-two (32) owners or 84% of owners. Of which, 53% were supportive of the idea of a walking and cycling trail, some with provisos such as adequate separation of trail users to private properties by fencing and the control of rubbish. 44% were not supportive of a trail. 3% were neither supportive nor not supportive. The remaining landowners could not be contacted, but would need to be reached if Council proceeded with a path in the future.
- There is an existing walking trail of just over four kilometres in length to the immediate north side of Colac's town grid of well-established residential streets, including the picturesque and elevated setting of the Colac Botanic Gardens. The path has varying surfaces - gravel, asphalt, brick and concrete – and is bounded by the Barwon Water Colac Water Treatment Plant to the east and Stodart Street Park to the west.
- The continuation of the pedestrian and cycling path that currently is at Stodart Street Park can be achieved on the west side of Lake Colac as most of the foreshore edge to the west side of the lake is Crown land. It is clear that the trail on Crown land is the best route in terms of land management and maintaining separation from adjoining rural properties. In sections of low-lying land boardwalk(s) will be considered.
- Council is in the process of finalising a development plan relating to land north of the Princes Highway between Ross Street/Bilson Street/Stodart Street and Rifle Butts Road (known as the Colac West Development Plan area). The plan includes a requirement for developers of these land parcels to extend the current shared path on 'flood free' land from its existing termination point at Stodart Street through to Rifle Butts Road. The plan also includes several other requirements that will support better pedestrian, cyclist and vehicle links between the new development area, the lake and the Colac township, which includes:
  - An east-west extension of Moore Street to connect with Rifle Butts Road.
  - A new north-south connector road from the Lake Colac foreshore to Murray Street along the western boundary of the former High School site.
  - A service lane along the Murray Street frontage to provide lot access for lots fronting Murray Street.
  - Maximised road frontage to the Lake Colac foreshore, subject to cultural heritage considerations.
  - Extension of public open space along the edge of Lake Colac that is not susceptible to flood in a 1AEP (one in 100 likelihood) event, including an extension of the shared pathway along the foreshore, subject to cultural heritage considerations.
  - Provision for future connection of a pedestrian link through residential land to the east to Ross Street.
  - There is an opportunity connect pathways from the trail to various access points of the light industrial and residential planned subdivisions either side of Rifle Butts Road to the Princes Highway and on Rossmoyne Road. Colac Otway Shire Council has prepared a Precinct Structure Plan (PSP) which will aim to achieve residential development west of Rifle Butts Road and north of the existing industrial land in Rossmoyne Road, fronting the lake. The PSP will consider how development can best integrate with Deans Creek and the lake, and incorporate these into open space opportunities and shared trail connections. Council's Planners have provided the subdivision developers guidelines on access points and layouts.
- Having gained the support in the principle from approximately half of the landowners and the knowledge that the west side of the lake has a considerable length of flat to gently undulating Crown land, the feasibility study focussed on the potential for the trail to the western and northern sides to link the town of Colac to Boylans Road, Rossmoyne Park, Drakes Lagoon and finally Meredith Park. There are several major constraints in locating a trail to the eastern side of the lake. These are land

ownership which in many cases appears to go to the waterline, ongoing erosion, which is significant in some sections, the extent of the existing embankment and in some cases, cliff faces, and the loss of privacy for property owners with dwellings close to the lake, trail users scaring cattle and concern about costs. The future planning and design process must consider the loss of privacy and biosecurity matters for some landholders and the installation of regulatory signage to manage the behaviour of trail users with respect to interference with fencing, control of litter and fire. To further minimise loss of privacy, formative screen planting should be undertaken at critical locations during the first stage of construction of the trail.

- Managing impacts on the Corangamite Water Skink and water birds will be critical in achieving any shared trail. The shared trail design should rigorously control access to culturally sensitive sites, and sensitive habitats by trail users and dogs. An assessment was made of the physical accessibility of the lake and the potential barriers to/opportunities for a shared trail to be developed around the lake.
- During the preparation of the potential trail route, cost plans were prepared to cover the further research, planning, design and construction of the entire trail. With the preparation of cost plans (Opinion of Probable Cost), it is evident that the trail will need to be planned and certainly constructed in stages, commensurate with the preparation and documentation supporting grant applications and then the awarding of grant funding. This further strengthens the case for the trail to commence at the Stodart Street Park and embrace the immediate future connections to the planned residential and light industrial subdivisions west of Rifle Butts Road, Deans Creek through to Rossmoyne Road to the west and both sides of the Princes Highway. Developers need to be made aware of the opportunities for connectivity to the trail and the trail to link properties. Council may be in a position to leverage funding from developer contributions as well as higher levels of government to achieve sections of trail. At this point in time, developers can only be required to put in paths east of Rifle Butts Road. Future connections west of Rifle Butts Road will depend on the outcome of the PSP and rezoning.
- As the trail would head north-west from Deans Creek, there are several readily accessible locations from existing roads. These vehicular-accessible locations provide ideal vehicle pooling as drop-off and pick-up points for groups or individuals to undertake connected journeys or loop journeys of 3 to 5 kilometres length along sections of the trail. The first is Boylans Road, where a small car park area could be established to enable vehicle access to the lake. The second is Rossmoyne Park, a small Parks Victoria park and informal open space/park. The third is at the junction of Ryans Lane and Langs James Road immediately north of Drakes Lagoon. The next publicly accessible location is at Meredith Park, accessed from Meredith Park Drive that meets the Colac to Ballarat Road.
- There are significant risks for the development of the trail aside from funding and budget allocations. The key risk will be management and avoidance of the environmental and cultural heritage values and sites.
- There are some areas of native vegetation and significant threatened fauna species present that will require consideration as part of the shared trail design process and within any planning approval processes. A review of the threatened fauna records indicated that there is one reptile species, the Corangamite Water Skink, and a range of native water birds that continue to use the habitat in and around Lake Colac. Lake Colac has four known populations of the Corangamite Water Skink out of a total population of 30 sites in Victoria. This study recommends a detailed conservation study to be undertaken on the extent of the Corangamite Water Skink colonies around the lake.
- Parks Victoria has an established assessment and authorisation process when considering requests from other authorities for use of Crown land (in this case, known as a Parks estate). In order for Parks Victoria to consider requests, Council would need to demonstrate that a perimeter path is consistent with the Land Conservation Council's (LCC) recommendations for Lake Colac, as a Lake Reserve (also known as a Natural Features Reserve). Whilst recreation is one of the lake's designated uses, so too is

wildlife conservation. Protection of cultural heritage and biodiversity values is also a primary consideration.

- The trail has potential to deliver recreation, health, social, tourism and economic benefits. The trail will provide the Colac and district communities with additional open space areas to be active and engage with the environment. The trail will add another reason for people to visit and possibly stay longer in the Colac Region, boosting spending at local businesses. Colac and the nearby small townships may benefit from visitors going to restaurants and snack shops. Sports/bike shops, bike repairers and sportswear shops may benefit from increased activity. The construction of the trail will generate economic activity in Colac and will need to be confirmed in the future cost benefit analysis as part of the planning and detailed design process.
- The opinion of probable costs for the comprehensive planning, investigation, design and construction of the entire trail of approximately 30.5 kilometres length is in the order of $29,520,774. The western side with its significant stretch of Crown land to the foreshore between Deans Creek and Meredith Park, is approximately 21.7 kilometres. This section has several accessible points by road that will serve as pedestrian and cyclist access points for those trail user arriving by vehicle, to use the trail as loop or return sections without having to undertake the entire 30.5-kilometre journey and return. These manageable sections will allow council to incrementally apply for grant funding to enable the trail to be constructed progressively in 3-to-4-kilometre sections.
- To facilitate the complete loop of the lake two options have been explored, the first as Option A: is to take the trail route from Meredith Park and east along Meredith Park Road to join the Colac-Ballarat Road and meet Flaxmill Road near the Barwon Water Treatment Plan. As this is a 100kph speed limit road, there are strict regulations on the safe distance from traffic lanes that a walking and cycling trail can be established. The distance is at least 9 metres. As the road reserve is less than nine metres, land acquisition would be required to establish the trail to the frontage of most properties on the western side of the Colac-Ballarat Road. The Opinion of Probable Costs for this route of approximately 8.8 kilometres, including barrier railing is included in the $29,520,774 sum. The second, Option B: is to take the trail route south from Meredith Park along the edge of the lake's foreshore to meet the Barwon Water Treatment Plant and Flaxmill Road, a distance of approximately 6.8 kilometres. The foreshore edge varies from a gentle beach-like formation in the north, however by Irrewarra School Road and its road reservation, a strongly defined embankment edge is present. The embankment edge has been the subject of erosion of many decades and land that was originally reserved by the Crown on the eastern side of the lake has been eroded away. This edge is subject to prevailing south-westerly and north-westerly winds creating wave action that pounds the base of the embankments and cliff faces causing continuing erosion and collapse of farmland. The benefits of locating the trail on the eastern foreshore is the combined erosion control by rock revetment walling and the walking and cycling platform associated with the rock and concrete revetment walling. This combined infrastructure and the trail would have the advantage in securing grant funding, rather than individual projects. It is intended the 2.5-3 metre wide shared path trail would be of a concrete base, with additional concrete slurry poured between rocks forming the beaching and revetment walls/embankments. Works vehicles would access the platform formation as work progresses from north to south. The trail would sit 600mm – 1200mm above the high-water level which is controlled by Lough Calvert south of Meredith Park. The trail alignment will require further detailed planning, hydrological, geotechnical, environmental and cultural heritage assessments before any engineering design and documentation is undertaken. A summary of the construction, planning and design Opinion of Probable Costs is outlined in Appendix J. The Opinion of Probable Cost for Option B purely between Meredith Park and the Barwon Water Treatment Plant is $25,149,257. The Opinion of Probable Cost of the entire Lake Colac loop path using the Option B route (to the east side of the lake edge) is $46,152,562.

- It is important to note that the Lake Colac Foreshore Master Plan 2016-2026 identifies many sections of the existing lake foreshore path network that need extensions, improvements and upgrades (widening, surfacing, improved connectivity, lighting, planting, landscape works, etc.) to achieve better consistency and meet the required shared pathway standards. Council should consider prioritising work on existing pathways in the short term, as well as consider the cost and resources required to construct and maintain existing and new paths when evaluating the feasibility and sustainability of a more extensive lake perimeter path.

Recommendations

The recommendations of the Colac Perimeter Lake Path Feasibility Study are as follows:

1. Use the Lake Colac Advisory Committee as the Project Reference Group (PRG), where members have technical knowledge of the lake and its opportunities and constraints. The PRG can advise on future investigation, research, planning and design of either the entire trail as the 'big picture' and at the same time, the manageable and incremental sections commentary at the Stodart Street Park and Deans Creek section. The PRG should comprise Council Officers and representatives from Parks Victoria, the Corangamite Management Authority and DEECA.
2. Adopt Plan A - Potential Path Layout as the preliminary concept plan for the lake path.
3. Accurately locate Crown land zones, through a licensed surveyor to undertake a feature and level survey of the lake's foreshore and a boundary re-establishment survey. These will then determine precise trail alignments relative to Crown land and private land ownership. The two surveys will then inform decisions on the Crown land above the accepted high-water line that is available for the on-grade trail on the west side of the lake without impinging on private land. The two surveys will be used to locate the appropriate style of separation fencing of private and public land. In a couple of instances, where private land extends into the water's edge on the western side of the lake, boardwalks have been considered beyond the property boundary on Crown land.
4. Work with Council Planners and developers on the likely initial trail sections to be constructed - the Deans Creek and Rifle Butts Road to Rossmoyne Road sections.
5. Maintain discussions and strategies with Parks Victoria for Council to progress planning for a future path, with Parks Victoria suggesting their preferred way forward is for Council to take the role as the Committee of Management (COM) for the lake and foreshore.
6. Continue the emphasis of connectivity to the light industrial and residential subdivisions currently at the planning stage with Council and the respective developers.
7. As part of pre-planning investigations/a staged approach, undertake further discussions with property owners in person to ensure there is clear understanding of proposed trail locations, management arrangements and any interfaces with private land, so that any issues can be further discussed and negotiated.
8. Prepare an advocacy document to succinctly describe the key attributes of the west side trail from Stodart Street Park to Meredith Park. The document will support discussions with politicians and bureaucrats, and support funding applications and lobbying.
9. Ensure that the public authorities with jurisdiction over all or part of the lake, water and adjacent land are involved in the future investigation, research, planning and design process.
10. Prepare manageable sections of the trail commencing at Stodart Street Park to Deans Creek to Boylans Road and then future sections to Rossmoyne Park, Drakes Lagoon and then to Meredith Park.
11. As a separate project, investigate the safety, feasibility and cost to run a path from Drakes Lagoon to the Cororooke Community. Further detailed investigations into a link to Cororooke was not within the

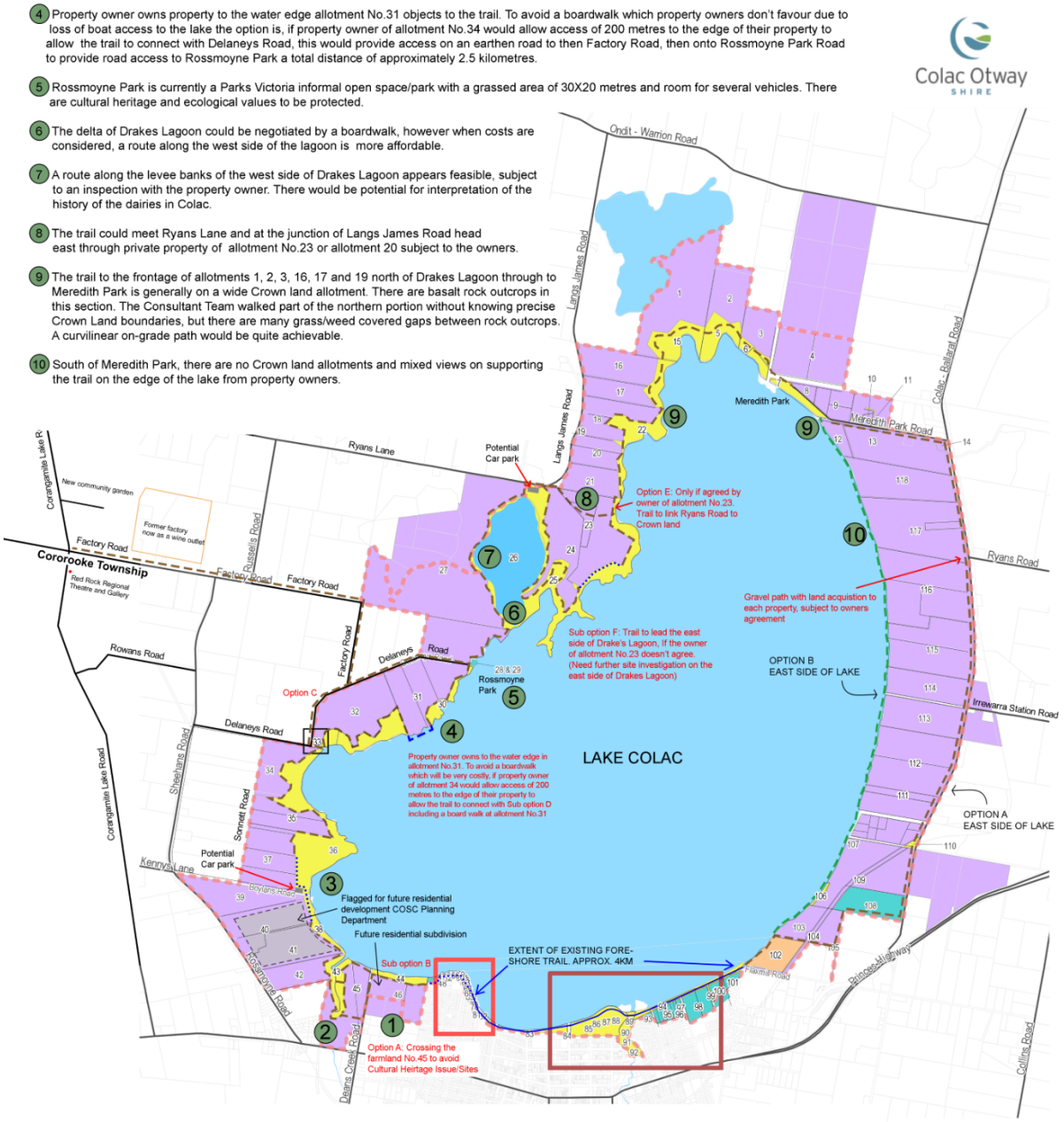
scope of this feasibility study. However, Michael Smith and Associates suggests that a trail along Factory Road would be a primary link to investigate.

12. If Council wishes to pursue a path on the east side of the lake, investigate the safety, feasibility and costs for a trail parallel to the Colac-Ballarat Road within the road frontages of private properties facing the Colac-Ballarat Road as Option A. Rural Roads Victoria and property owners to be involved. This would require land acquisition of a 6-9-metre-wide strip of land approximately 7.5 kilometres in length, and a further 1.3 kilometres along the edge of Meredith Park Road, to join Meredith Park Road to Flaxmill Road at the site of the Barwon Water Colac Water Treatment Plant.
13. Further detailed field studies are required for Option B for the trail to run parallel with the eastern edge of the foreshore for a distance of approximately 6.8 kilometres from Meredith Park to Flaxmill Road.
14. Given the high cost of development and the need to manage environmental and cultural heritage risks, Council may need to reduce the overall scope of the path extension. The feasibility study provides a valuable foundation for progressive development, allowing Council to prioritise sections with the strongest prospects for delivery and support.

Plan A –Potential Path Layout

NOTES TO PLAN NUMBERS

1. Future residential subdivision and potential for the subdivision's path network to connect to the trail.
2. Deans Creek and delta outflow to the lake. Optimum route is to skirt either side upstream of the creek to the area of the existing timber bridge and cross the creek. Potential rest area and interpretive information.
3. Boylans Road Potential car park mid-way along the road. Low lying land, the on-grade trail needs to be as on high ground to avoid inundation in high rainfall events.
4. Property owner owns property to the water edge allotment No.31 objects to the trail. To avoid a boardwalk which property owners don't favour due to loss of boat access to the lake the option is, if property owner of allotment No.34 would allow access of 200 metres to the edge of their property to allow the trail to connect with Delaneys Road, this would provide access on an earthen road to then Factory Road, then onto Rossmoyne Park Road to provide road access to Rossmoyne Park a total distance of approximately 2.5 kilometres.
5. Rossmoyne Park is currently a Parks Victoria informal open space/park with a grassed area of 30X20 metres and room for several vehicles. There are cultural heritage and ecological values to be protected.
6. The delta of Drakes Lagoon could be negotiated by a boardwalk, however when costs are considered, a route along the west side of the lagoon is more affordable.
7. A route along the levee banks of the west side of Drakes Lagoon appears feasible, subject to an inspection with the property owner. There would be potential for interpretation of the history of the dairies in Colac.
8. The trail could meet Ryans Lane and at the junction of Langs James Road head east through private property of allotment No.23 or allotment 20 subject to the owners.
9. The trail to the frontage of allotments 1, 2, 3, 16, 17 and 19 north of Drakes Lagoon through to Meredith Park is generally on a wide Crown land allotment. There are basalt rock outcrops in this section. The Consultant Team walked part of the northern portion without knowing precise Crown Land boundaries, but there are many grass/weed covered gaps between rock outcrops. A curvilinear on-grade path would be quite achievable.
10. South of Meredith Park, there are no Crown land allotments and mixed views on supporting the trail on the edge of the lake from property owners.



LAKE COLAC PERIMETER PATH FEASIBILITY STUDY
POTENTIAL PATH LAYOUT
COLAC OTWAY SHIRE COUNCIL
MICHAEL SMITH AND ASSOCIATES
Inconjunction with the following subconsultants:
ASR Research / Andrew Long and Associates / Practical Ecology /
OPS Engineers / Harlock Consulting / Peter Tesdorpf and Associates

N

- POSSIBLE TRAIL OPTION B EAST SIDE OF LAKE
- POSSIBLE TRAIL (CONCRETE)
- POSSIBLE TRAIL (GRAVEL)
- POSSIBLE BOARDWALK
- EXISTING TRAIL/PATH

0 100 500 1000 metres

- BARWON REGION WATER
- CROWN LAND
- COLAC OTWAY SHIRE
- PRIVATELY OWNED
- PROPERTY BOUNDARY
- TITLE BOUNDARY
- FEASABILITY STUDY AREA
- MAJOR ROAD NETWORK

TABLE OF CONTENTS

1. INTRODUCTION

1.1 The City of Colac and Lake Colac

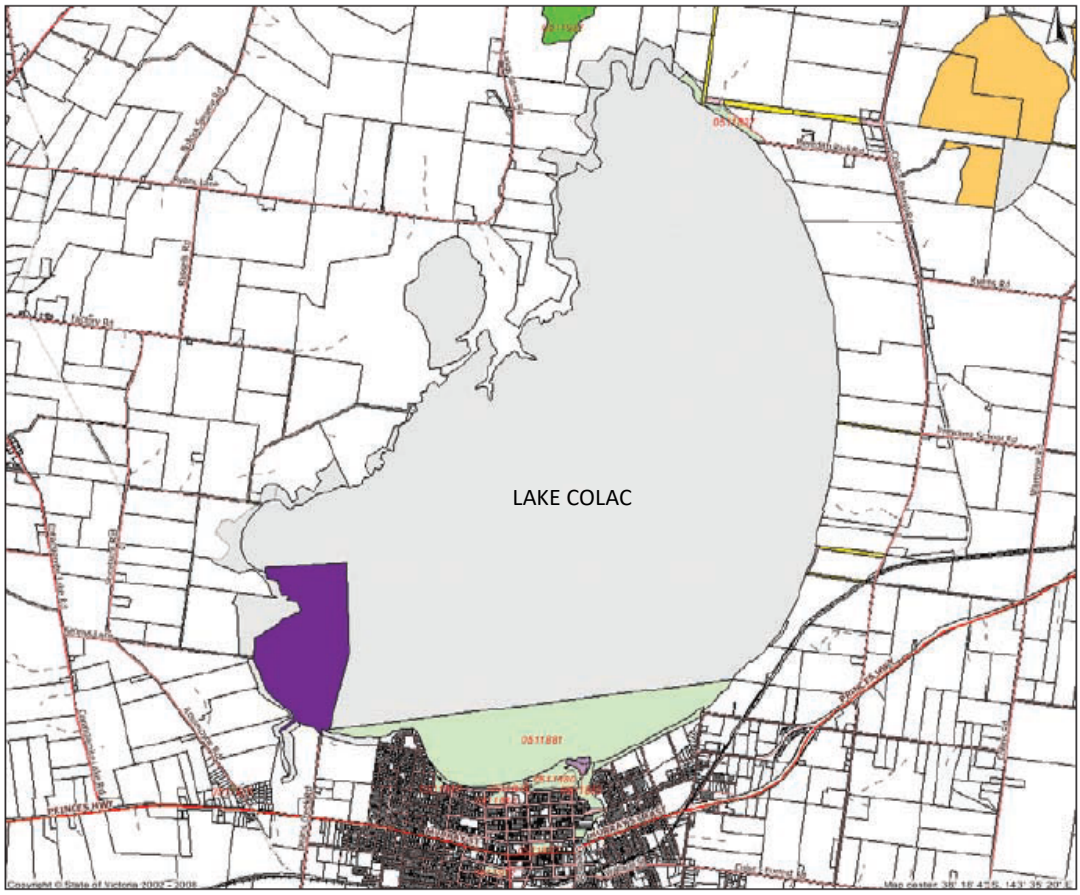
The City of Colac is located 74 kilometres south-west of the City of Geelong and 150 kilometres west of Melbourne. Colac is a regional agriculture, commercial and civic service centre with a population of 12,756 (2021 Census). Colac lies on the eastern edge of the world's third largest volcanic plain, surrounded by a landscape of lakes and volcanic craters. It is the eastern gateway to the Volcanic Discovery Trail and surrounding volcanic plains with the plentiful small basalt rocks giving rise to the construction by early settlers of dry-stone walls to contain cattle and sheep within properties and keep rabbits out. Some walls remain to properties to the north side of Lake Colac.

The city has a strong grid layout of streets, with the earliest residential settlement being close to Lake Colac and Colac Botanic Gardens. The surrounding rural land is used for dairying, beef and lamb production. Several processing dairies were established in Colac.

Lake Colac is situated to the immediate north of the Colac city centre. Lake Colac is the largest freshwater lake in Victoria with a shoreline of 28.3 kilometres and one of the defining geographic features of the Colac Otway Shire. Lake Colac covers 1,820 hectares (ha) and has an average depth (when full) of 2.5 metres. The lake is zoned Public Conservation and Resource. When it contains water, Lake Colac is a significant regional asset and a provider of water-based activities, including recreational fishing, rowing, swimming, sailing, duck hunting, water skiing and camping. Landowners adjoining Crown land around the edges of the lake have traditionally taken an active role in the ongoing maintenance of those sections of land. Parks Victoria has confirmed that it does not issue grazing licences for sections of Crown land under its management. The lake is home to a number of local clubs and sporting groups, including the Colac Yacht Club, Colac Rowing Club, the Colac Anglers Club, Colac Rifle Club, Colac City Band Club and the Colac Sea Scouts. The lake also has environmental values – e.g., the shallow water and reed beds provide food, shelter and drought refuge for a range of water birds.

It was raised during the consultation and engagement process, the compatibility of duck hunting with trail use. Duck hunting is currently permitted on the lake. The joint use will need to be revisited, in consultation with Game Management Authority and DEECA, during the future planning and design stage. The trail on the western side of the lake offers greater flexibility in diverting trail users from the trail to the local road system, than that of the trail on the eastern side of the lake.

Land parcels surrounding the lake are owned by State or Commonwealth Government and private land holders. The Colac Otway Shire Council does not own any land adjoining the lake but manages the Lake Colac Foreshore between Rifle Butts Road and the Colac Regional Saleyards, and a very small segment of the lake's southern shallows, and Meredith Park, on behalf of the Crown. Management arrangements are depicted on the map on the following page, extracted from the then Department of Sustainability and Environment's 2010 Drying Lakes Project. The foreshore area provides linkages to the township and also fulfils a range of functions, including residential housing, local sports and community group clubhouses, a caravan park, and picnic facilities. Colac Otway Shire defines Lake Colac as, "…one of the defining geographic features for the Colac Otway Shire. It is a symbol of Colac itself and deeply entrenched in the local community's sense of place."



Key

- Private land
- Crown land under licence by Colac Otway Shire as Committee of Management
- Crown land managed by Parks Victoria
- Crown land licensed by Colac Rifle Club, managed by Parks Victoria
- Crown land Caravan Park managed by Colac Otway Shire
- Government road
- Grazing licence

Drying out of water bodies during drought periods is a natural process and in some cases lake beds can dry completely and remain so for a long time. Over the summer of 2008-2009, Lake Colac dried out completely. With increased rainfall post 2009, the lake partially refilled and was virtually dry again during 2015.

With above average rainfall during 2022, the lake was at near full capacity during the feasibility study. During the dry periods of 2007-2009 and 2015, Colac Otway Shire Council made use of the dryness of the lake to carry out extensive rehabilitation works on Barongarook Creek, including exotic tree removal, bank stabilisation,

planting indigenous species and carp control actions. The Western Victorian Lakes have long been the focus of scientific and conservation work, because of the important ecological communities they support. Many of the lakes are showing significant signs of stress due to extended drought and climate change.

In the southern portion of the lake addressing part of the established residential area, the botanic gardens, caravan park and bird sanctuary that was established pre-Council amalgamation to treat stormwater before it enters Lake Colac, there is a walking and cycling track of just over four kilometres length, consisting of various materials, concrete, brick, asphalt and granitic gravel. The existing path links residential areas to the west and the pathways around the botanic gardens through to the Barwon Water Colac Treatment Plant at Flaxmill Road.

Colac Otway Shire Council and the local community have considered the extension of the current Lake Colac walking/cycling trail all the way round the perimeter of the lake as an exciting opportunity to embrace the environment and amenity value of the lake. The lake has generally been regarded as being an under-utilised asset that has the potential to provide greater social, recreation, economic and tourism benefits.

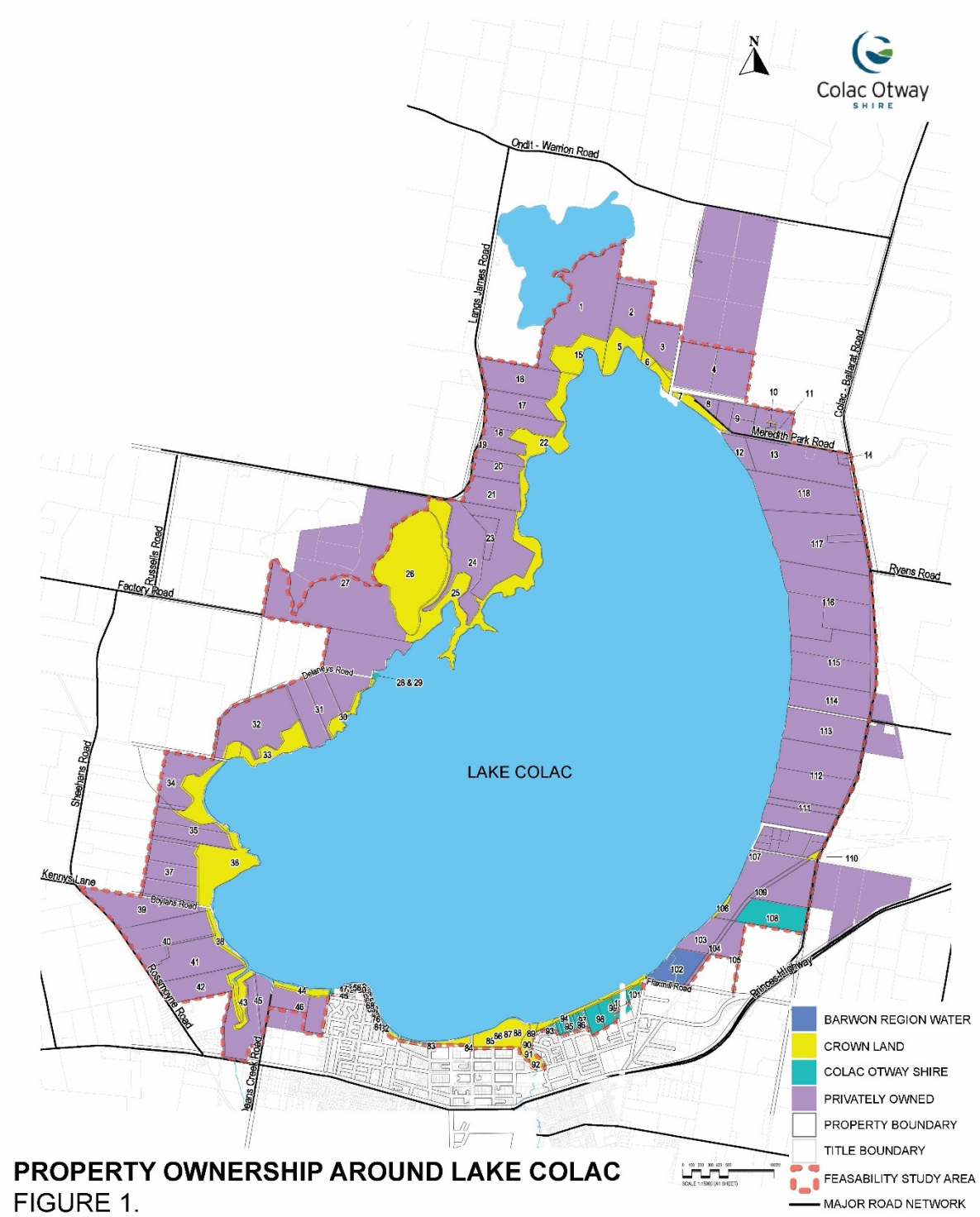
The Cororooke community located to the northwest edge of the lake and the Lake Colac Co-ordinating Committee have long advocated for a shared trail from Colac to Cororooke. A recommendation for the Lake Colac Foreshore Masterplan 2016 is to "continue to work with relevant parties to advocate for pathways around the lake and investigate options to achieve this."

1.2 Property ownership around Lake Colac

Land Ownership is the underpinning parameter to the assessment and support or otherwise for the establishment of a walking and cycling trail to the perimeter of Lake Colac. Of the 28.3 kilometres circumference of the lake's immediate water's edge (See Figure 1):

- 22.7% is devoted to farming, most of which is to the eastern side of the lake, the land is zoned as Farming.
- 58.7% is devoted to Crown Land vested in control of either Colac Otway Shire Council or Parks Victoria. It is zoned Public Conservation and Resource extending from Meredith Park to Drakes Lagoon, then from Delaneys Road to Deans Creek.
- 12.7% is land to the south side of the lake abutting the town grid and botanic gardens and the caravan park is zoned as Public Park and Recreation. This section has a mix of concrete, bricked paved and granitic sand/gravel paths.
- 1.7% of Land to the east side taken up by the Barwon Water Colac Treatment Plant is zoned Public Use Zone Service and Utility.
- 2% of land between Rifle Butts Road and the Public Park and Recreation Zone is zoned General Residential.
- 2.2% of land immediately east of Rifle Butts Road is zoned General Residential, and has a Development Plan applied.

Figure 1 – Property ownership around Lake Colac



PROPERTY OWNERSHIP AROUND LAKE COLAC
FIGURE 1.

1.3 Features Around the Lake

1.3.1 Colac Botanic Gardens

The Colac Botanic Gardens are particularly memorable for their expansive northern view cone obtained from the elevated northern edge of the gardens. The gardens are one of only two botanic gardens in Victoria where cars can be driven around the perimeter, thereby providing people with mobility challenges and those with young families the opportunity to enjoy the gardens and the views to the north across Lake Colac.

1.3.2 Pathway below the botanic gardens

A brick paved pathway links the access track from Gellibrand Street past the Rowing Club to the Anglers Clubroom and boat launching ramp at the Queen Street end. A key feature to the foreshore below the botanic gardens is an Aboriginal sculpture. The Colac Otway Shire's Lake Colac Foreshore Arts Project involved the community and collaborative process to celebrate the environmental, cultural and social history. The design is based upon the left hind footprint of a Tachyglossus, the ancient ancestor to the Echidna. The pad is the shape of Lake Colac and is divided into sections representing totems used by local Aboriginal peoples, the Gulidjan/Kolacgnat. Features are Bunjil the Wedge Tail Eagle, Wea the Crow, Black and White Cockatoos, an Eel and Fish are surrounded by water ribbons found in wetlands and local streams. The claws of the Tachyglossus footprint comprise the Boomerang, the Manna Gum leaf and Red Rock as a volcano.

1.3.3 Meredith Park

Meredith Park is Crown land managed by Colac Otway Shire Council. It is a popular recreation destination on the northern fringe of Lake Colac, about 12 kilometres' drive north of the Colac township. The park is used for boating, picnicking, free camping and fishing. A walking/biking connection between the main foreshore of Lake Colac and Meredith Park would greatly enhance the lake's tourism and recreation potential. The park is usually busy with caravans and tents over the Christmas, New Year and Easter periods, as well as public holiday periods.

Meredith Park Camping Ground is vehicle accessible and is currently a free camping site that is Crown land, managed by Colac Otway Shire Council. The camping ground has a four WC toilet facility, an old concrete picnic setting and one small picnic shelter and table. There are two interpretive signs about the critically endangered Corangamite Water Skink that inhabits the scattered basalt rock outcrops. The fissures of the basalt rocks cracking are quite special as the basalt rocks have split with a grid of narrow openings or cracks. The rocks are yet to be dislodged and break apart as separate rocks, that for most will be in the geological timeframe of millions of years. The Corangamite Water Skink inhabits these seams or cracks. To the camping ground's edge, there is direct access to the lake's foreshore for a length of approximately 400 metres. The southern end of the foreshore associated with the camping ground terminates at a fence where recent replanting has been undertaken by the adjoining property owner. The northern end has clusters of basalt rock outcrops surrounded by pasture grass. The groups of Monterey Pine trees provide a stark contrast to the well vegetated foreshore.

1.3.4 Rossmoyne Park

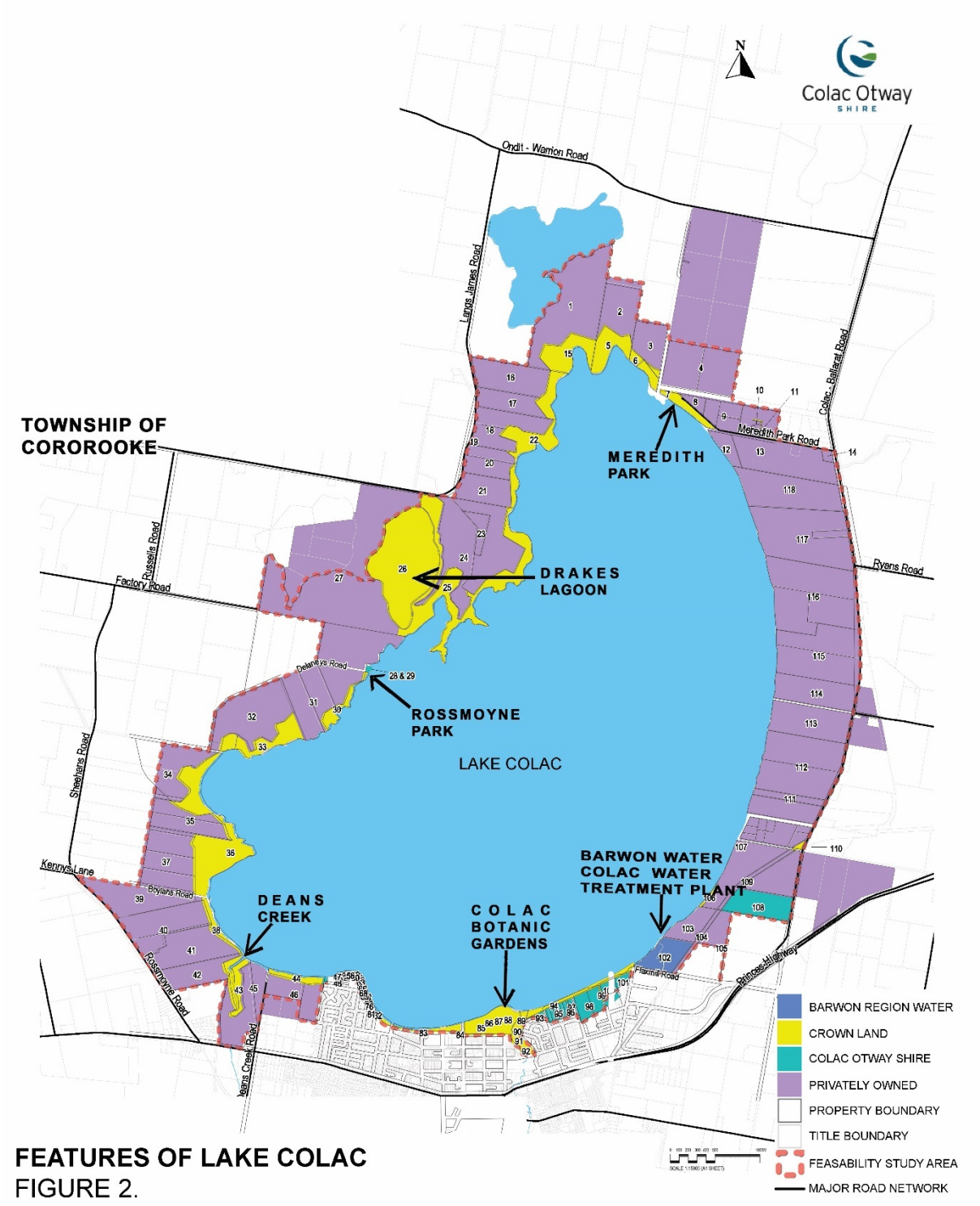
Rossmoyne Park is Crown land managed by Parks Victoria, which has a small open space area and pedestrian access to the foreshore in amongst basalt rocks. A feature of the area is the basalt rocks which are home to the endangered Corangamite Water Skink. A walk around the area revealed low basalt rock outcrops near the

high-water line. Rossmoyne Park area has a limited length of frontage to the lake. The foreshore is a flat terrain with typical foreshore low vegetation, including some phragmites.

1.3.5 Drakes Lagoon

Drakes Lagoon is a large natural shallow water basin that collects water from Bullock Swamp Drain before entering the lake. Drakes Lagoon played a significant role when dairy companies Fonterra (which was formerly Bonlac and the Colac Dairying Company) constructed levee banks to create basins to filter contaminated water from processing operations, before the water entered the lake.

Figure 2 – Features of Lake Colac



2. LITERATURE REVIEW

2.1 Documents

The following documents were reviewed during the study:

- Colac Otway Shire Community Vision 2050
- Colac Otway Shire Council Plan 2021-2025
- Colac 2050 Growth Plan
- Colac Otway Shire 2013-2023 Active Transport Strategy
- Economic Development Strategy 2019-2024
- Lake Colac Foreshore Masterplan 2016-2026
- Lake Colac Foreshore Masterplan 2016-2026, excerpt from masterplan about existing and future paths
- 2003 Lake Colac Socio-Economic Assessment Profile D17/78878
- 2018 Deans Creek and Barongarook Creek Flood Study: D18/5511
- 2007 Lake Colac Commercial Development opportunity profile, cost benefit analysis and economic impact assessment: D15/54635
- Eastern Maar Country Plan

2.2 Information

The above documents contain the following key information:

- The Council's vision statement for the Shire, as developed in partnership with a deliberative panel of community members.
- The strategic directions and priorities for the Colac Otway Shire community for the period 2021-2025.
- A growth strategy for Colac through to 2050.
- Proposals to enhance the active transport network in the Colac Otway Shire to encourage walking and cycling.
- The actions Council will take to support economic development in the Shire.
- A framework to guide the planning and development of the area of the foreshore that extends east-west between Rifle Butts Road and Clark Street; and north-south from the foreshore along the Barongarook Creek Corridor to Murray Street
- A description of the condition of the existing pathway around the lake and how it could be extended and improved.
- An assessment into the socio-economic benefits of redeveloping Lake Colac.
- Hydrologic and hydraulic flood models to characterise the flooding in the Deans Creek and Barongarook Creek areas.
- A plan containing Eastern Maar cultural knowledge, values and perspectives, and ideas and priorities for opportunities that the Maar people seek including native title negotiations and rights.

2.3 Relevance and implications

The relevance and implications of the documents for the trail study are as follows:

- The feasibility study should take into consideration:

  - The Council's goals of promoting sustainable tourism in Colac and achieving the relevant goals of the Shire's Community Vision – that being enhancing access to and the enjoyment of key infrastructure assets like Lake Colac.
  - The relevant key directions of the Council Plan – these being:
    - Maximising key tourist attractions.
    - Facilitating development of sustainable visitor infrastructure and accommodation.
    - Protecting native vegetation, ecosystems, flora and fauna.
    - Planning, designing and maintaining attractive and safe public spaces in partnership with community and key agencies.
- The feasibility study should consider the attributes, potential, values and opportunity of Lake Colac as described in the Colac 2050 Growth Plan – these being:
  - Lake Colac is an important environmental, cultural heritage, aesthetic and recreational feature for the community and town of Colac.
  - Lake Colac was a significant resource and focal point for Aboriginal people and later European migrants.
  - Colac has opportunities to expand its leisure trail networks including the Old Beechy Rail Trail and pathways along its creek lines and Lake Colac Foreshore, connecting nearby hamlets such as Beeac and Cororooke.
  - The lower reaches of Deans Creek, particularly near Lake Colac, are culturally sensitive and significant sites.
  - The land to the east of Rossmoyne Road has Lake Colac frontage. There is an opportunity to connect this area back into town through an extended open space corridor along the lake.
- There is also an opportunity to consider the broader open space connections to Cororooke to the west and Beeac to the east to connect via roadways and potential future roadside pathways.
- The extensions to the path network as described in the Active Transport Strategy 2013-2023 should be considered in the feasibility study, these being the lake path extending to the west along the foreshore of Deans Creek and then south along Deans Creek and a path extending off the lake path south along Barongarook Creek.
- The feasibility study for and the design of the trail should consider the vision and key findings of the Lake Foreshore Masterplan, these being:
  - The lake as a place to explore, embrace and nurture the natural world and have fun.
  - The AHD level to trigger the outflow of the lake to Lough Calvert is 117.4 metres (as advised by Corangamite Catchment Management Authority in February 2023, however this should be confirmed within the future detailed hydrological study).
  - The discharge channel connecting the Lough Calvert basin to the Birregurra Creek was extended to Lake Colac to allow seasonal releases of water from the lake to the Barwon River to limit the occurrence of future flooding.
  - Lakeshore erosion is a natural process in Lake Colac. It particularly occurs on the eastern bank of Lake Colac due south-westerly, westerly and north-westerly winds.
  - The erosion to the eastern edge of the lake combined with no Crown land available, unlike the western edge, make the construction of the trail quite problematic on the eastern side of the lake.
  - Lake Colac has significant habitat areas. The natural habitat for the Corangamite Water Skink is found in two known sites of the lake's shore - near Meredith Park and Rossmoyne Park.
  - A bird sanctuary area was constructed at the eastern end of The Esplanade Pre-Council amalgamation (1994) to treat stormwater before it enters Lake Colac. It is linked by the existing 2.5-metre-wide gravel trail that connects the car park east of the caravan park to the Barwon Water Colac Treatment Plant.

  - The sealed sections of the foreshore pathway are frequently used. The unsealed track from the wetlands to Clark Street is also popular, especially for dog walkers. Residents use the foreshore for a variety of activities with trail-related activities amongst the most popular.
  - The development of additional paths preferably connecting to the existing path should be explored. There is potential to link the western side past Boylans Road to Rossmoyne Park, then further north the path could edge around Drakes Lagoon or alternatively by road to the township of Cororooke via Factory Road. The available Crown land to the northern edge of the lake could connect the trail from the Drakes Lagoon area to Meredith Park.

- The feasibility study should consider the comment made in the Lake Colac Foreshore Masterplan about the existing path attributes and condition of the existing path and its potential for expansion, that being there is merit in considering options for extending shared pathways to the west of Rifle Butts Road zone as part of a long-term strategy to extend a pathway east and west around the perimeter of the lake.
- The feasibility study should consider the findings of the Lake Colac Socio-Economic Assessment Profile which indicate that the enhancement of the Lake Foreshore will have significant socio-economic benefits.
- Opportunity to consider the establishment of a lakeside path to the east side, but due to the erosion issue, take the Colac-Ballarat Road. Erosion control is outside the scope of this study and would require a multi-government approach with partnership by Council, Parks Victoria, DEECA and landowners.

3. FEASIBILITY ASSESSMENT

3.1 Factors and Criteria

The following factors and criteria need to be considered in assessing the feasibility of developing the trail:

- The requirements of Colac Otway Shire's Planning Scheme.
- Adjoining property owners' support in principle for, or non-support of, the perimeter trail.
- Support or otherwise from authorities with jurisdiction over and/or interests in the lake – Parks Victoria, Department of Environment, Energy and Climate Action (DEECA), Corangamite Catchment Management Authority, Barwon Water and Safe Transport Victoria.
- The knowledge of relevant Council officers about the planning, development, delivery, maintenance and ongoing management of the trail.
- Physical access issues and constraints.
- Environment and habitat constraints.
- Protection of Aboriginal and other cultural heritage.
- Considering the above, can a functional path be constructed around the lake?
- The benefits and cost of the trail.

3.2 Assessment

3.2.1 Adjoining landowners

Landowners adjoining the lake were asked to indicate their level of support for a trail around the lake, in particular whether they would agree to the trail traversing their land. The details of their responses were as follows:

- Council sent letters to all known landowners with properties adjoining Lake Colac (that did not already have an existing path adjoining their property). Those whose email addresses Council had were also contacted electronically. All were encouraged to complete a survey or contact Council and/or the project consultants to discuss the project. In all, thirty-two (32) landowners out of thirty-eight (38) landowners adjoining Lake Colac who do not currently have a path adjoining their property were contacted. Seventeen (17) supported the idea of the perimeter path around Lake Colac. Fourteen (14) were not supportive. One (1) landowner with a small holding was neither supportive, nor non-supportive of the trail.
- The landowners who were supportive of the trail indicated that it would be a great tourism, recreation, and commercial asset for the town. They made the following comments about the design and location of the trail and the opportunities it will create:
  - There will be a need for secure fencing/electric fences.
  - The water level should be made consistent.
  - The December 2022 water level should be used to determine where the trail should go (i.e., the water level in December 2022 was indicative of the nearly the highest level the lake would get before the Lough Calvert is operated, however this is statement of opinion given by one landholder and would need verification with a future hydrological study under the planning and design process).
  - There are significant Aboriginal sites that need to be respected and protected.

- Bird hides could be established around the lake.
- The trail could connect to the hamlet of Cororooke. There is potential for the path to connect to planned café and restaurant and the existing art gallery etc.
- Emergency access needs to be accommodated in case of a trail user suffering a medical episode.
- Drakes Lagoon and levee banks were planted by the property owner, creating habitats for bird and animal life. Potential link with Ryans Lane.
- Potential to link to Rowans Road (running between Corangamite Lake Road and Sheehan's Road) and the former railway line.
- Opportunity for the east side of the lake to have a trail that is combined with well-planned and designed infrastructure to control erosion caused by wind driven waves.

- The landowners who were not supportive of the trail gave the following reasons:
  - People and particularly dogs scaring cattle.
  - Issue of gates and fences allowing access, people are inquisitive, they will not stay on the trail.
  - Impracticable, due to steep cliffs to the southeast side.
  - Responsible use of ratepayers' money. Council/government should attend to other more important services/community facilities.
  - Litter and maintenance issues.
  - Emergency access, i.e., ambulance, fire and fire tracks.
  - Risk of fire caused by people/vehicles.
  - Loss of privacy, including proximity of trail users to dwellings that are close to the foreshore edge.
  - Loss of access to the water, if a boardwalk is constructed in front of a property (note: Parks Victoria advised that direct boat access to the lake is not permitted outside of the two formalised boat ramps at Colac and Meredith Park).
  - Public liability insurance issues for people walking on private land.
  - Concern about fluctuating water levels and the evolution of the lake from drying to full capacity.
  - The presence of basalt rocks and snakes.
  - Biosecurity concerns, particularly in light of the Indonesian outbreak of foot and mouth disease in 2022.
  - The legal use of firearms on Crown land and adjoining private land to control foxes and rabbits and potential hazard to path users.

3.2.2 Agencies

The following agencies were contacted during the study process:

- Corangamite Catchment Management Authority
  Land tenure and lake levels
  CCMA have undertaken some erosion work. Alluvium Consultant's report. Lough Calvert is the regulator channel.

- Barwon Water
  - Reviewed the preliminary trail layout and Barwon Water support Colac Otway Shire Council in the proposal for the perimeter trail. Barwon Water advised they will be willing for the consultant team/Council to inspect their grounds and make land available if this becomes a desired component of the Council perimeter path plan.

- Parks Victoria
  Parks Victoria's recommended approach is for Council to become land manager for the proposed path. In the event that a Lease is pursued, the following process would apply: Council would need to demonstrate the project is consistent with the Land Conservation Council's (LCC) recommendations for Lake Colac, as a Lake Reserve (also known as a Natural Features Reserve). Subject to Council progressing to more detailed stages of planning, Parks Victoria would then assess benefits before determining whether to authorise by interest of agreement.

  Parks Victoria's assessment process is as follows:
  1. Policy Assessment (i.e., VEAC- Victorian Environment Assessment Council)
  2. Impact Assessment (i.e., biodiversity and cultural heritage etc.)
  3. Practical Assessment (i.e., vehicle assessment and access points for trail users)
  4. Approval Assessment (i.e., planning permit and EPBC referrals)

  In low lying areas, Parks Victoria would prefer a more stable path surface than gravel, from an ongoing maintenance perspective, such as concrete or a spray seal. This has been factored into the cost plan within this study.

  Parks Victoria understand that any trail construction would have to be implemented in stages.

- Eastern Maar Aboriginal Corporation (EMAC)
  Attended the briefing meeting in August 2022 and preliminary inspection of some of the known cultural heritage sites and conveyed information to Andrew Long and Associates.

- Department of Energy Environment and Climate Action (DEECA) (formerly DELWP)
  DEECA has indicated its willingness to review the draft feasibility study and provide feedback accordingly.

3.2.3 Council officers

Council officers made the following comments:

- The wind moves the body of water. This is particularly noticeable when the lake is drier and the whole body of water can be observed shifting under the force of prevailing winds. Prevailing winds are south-west and north-west which cause embankments, deposition/erosion to the east side of the lake.
- There is a range of ownership arrangements with private property owners around the lake. This could make the development of a continuous trail complex to negotiate in some sections where there is no Crown land.
- The focus of the study should be on the feasibility of establishing the trail. Improved water quality would be valuable but is not the primary outcome of the feasibility study.
- If part of the feasibility is to fence off properties, pedestrian access to the path may need to be provided so that adjoining landowners can utilise the path.
- Parks Victoria has confirmed that regardless of whether a path is built or not, its preference is that boats should only be permitted to launch at the existing designated boat ramps along the southern

foreshore (near the Colac Yacht Club and Colac Angling Club) and Meredith Park. Parks Victoria further expressed the view and preference that boats are not launched from private properties.

- Council's primary principles for guiding the delivery of the path are that it should ideally be 2.5-3 metres wide and extended in stages with the priority being extension to the west of Stodart Street Park to the north Deans Creek area, where residential growth is currently being planned for. This will provide a pathway connection for new residential areas to the main lake foreshore area then potentially into the city of Colac.
- The feasibility study should consider maintenance requirements access, widths, weight etc for ride on mowers, slashers, topping up gravel etc. There is a preference wherever possible that maintenance can be automated rather than manual.
- Landowners' rights should be respected, and alternatives sought if they do not agree to the path traversing over their private properties. Where a path would adjoin or be close to their boundary (i.e., on Crown land) further negotiation could be entered in to.
- Protect cultural heritage and environment, plan for all abilities access wherever possible and investigate opportunities for loops, drop off points, shorter walks, access points, rest spots and signage etc.
- Council is currently working on two projects in the Deans Creek area. On the east side, the Colac West Development Plan area (between Rifle Butts Road and the former Colac High School site) is the subject of a planning scheme amendment that outlines a requirement for developers to work with Council to extend the path from its existing termination point at Stodart Street through to Rifle Butts Road. On the northwest side of Deans Creek Council is working on the Deans Creek Structure Plan. This project may also pave the way for achieving developer contributions towards a perimeter path in the areas immediately applicable to the development area.
- Council is managing consultant reports on Cultural heritage, soil report, Arboriculture, and biodiversity report as part of its work on the Colac West Development Plan. The Landscape and visual assessment report is yet to be prepared.
- Further investigations are taking place in to where a sewer line will cross the Deans Creek possibly near an existing timber-bridge. For the future residential land on the west and northwest side of Deans Creek, officers have confirmed that the plan will articulate a preference for a road frontage to the lake (similar to Queens Avenue), rather than properties' rear fence lines fronting the lake. Council's aim is to create open space between the lake and the subdivision on Rossmoyne Road which would include a walking path.

3.2.4 Environment and habitat constraints

As part of the feasibility study process, an ecological assessment of the lake environs was undertaken. The key findings of the assessment were as follows:

- Lake Colac is in the Victorian Volcanic Plains Bioregion, which is one of the largest volcanic plains in the world and also contains many lakes, varying greatly between salty and fresh water depending on the local geology, topography and water flows. This unique environment supports many habitats and native fauna species despite its modified state.
- It is a region of rich soils and often high rainfall which has been extensively developed for farming since European settlement. Many of the original indigenous flora and fauna and native habitats have been removed as part of the development of agriculture and urban development in the region. The shores of Lake Colac have been greatly disturbed over time and very little native vegetation remains. The lack of vegetation should make it easier to design a shared trail around the lake and creates the opportunity to implement vegetation restoration works that enhances habitat for native fauna.

- There are some areas of native vegetation and significant threatened fauna species present that will require consideration as part of the shared trail design process and within any planning approval processes. A review of the threatened fauna records indicated that there is one reptile species, the Corangamite Water Skink, and a suite of native water birds that continue to use the habitat in and around Lake Colac.
- Corangamite Water Skinks use the basalt rock outcrops along parts of the lake's shore to bask and forage in areas where they can prey on insects using the lake margin and fruits of Tree Violets. They also have immediate access to rock crevices for protection from predators. Corangamite Water Skinks are easily disturbed. If the trail is placed close to areas where the species occurs, the impacts of direct loss of habitat and ongoing disturbance by trail users need to be taken into account. This means that it is possible that any trail users will disturb the individuals every time they pass an area where they live and the very purpose and intent of the trail, i.e., regular use by people for fitness and relaxation, is the process that is problematic for the species.
- Many species of water birds have been observed using the open waters of Lake Colac and the habitats along the lake. Managing impacts on significant water birds will be an important design principle. Many water birds use open water beyond the foreshore of the lake. The trail will have little impact on this habitat. However, various water bird species use the shallow wetlands on open low relief slopes and areas of open reed on the lake shores as habitat areas. The trail and its users could disturb these habitat areas.
- Managing impacts on the Corangamite Water Skink and water birds will be critical in achieving any shared trail. The shared trail design should control access to culturally sensitive sites and sensitive habitats by people and dogs.

The assessment recommended as follows:

- Set back the shared trail from the lake shore as much as possible to prevent disturbance of stony rises and wetland margins on the lake's edges which are the most important habitats for threatened species.
- It is likely that access to the lake edge will be desirable for visitors so any viewpoints, fishing access and access for dogs swimming will need to be placed in areas with less habitat values.
- When stony rises and/or shallow wetland edges are adjacent to the lake's edge consider extra methods to limit disturbance, such as boardwalks, screens, bollards, and extra fencing.
- Require dogs to be on lead on the shared trail at a minimum, with strategic places with less habitat values and more space without habitat considered for off lead spaces. Prohibiting dogs may even need to be considered if regulatory authorities are concerned about human and dog disturbance on threatened fauna.
- Consider opportunities or requirements for ecological restoration and conservation management along the trail corridor. This would involve planting indigenous plant species at critical areas to enhance and protect wildlife habitat. Some of this work may be important for obtaining approval for the shared trail.

3.2.5 Cultural Heritage

An assessment of the known and predicted Aboriginal cultural heritage values of the lake was undertaken. The key findings of the assessment were as follows:

- Lake Colac includes areas of high impact activity. There are twenty-six (26) Registered Cultural Heritage places around Lake Colac. Key sites are Deans Creek and its delta, Drakes Lagoon to its eastern side

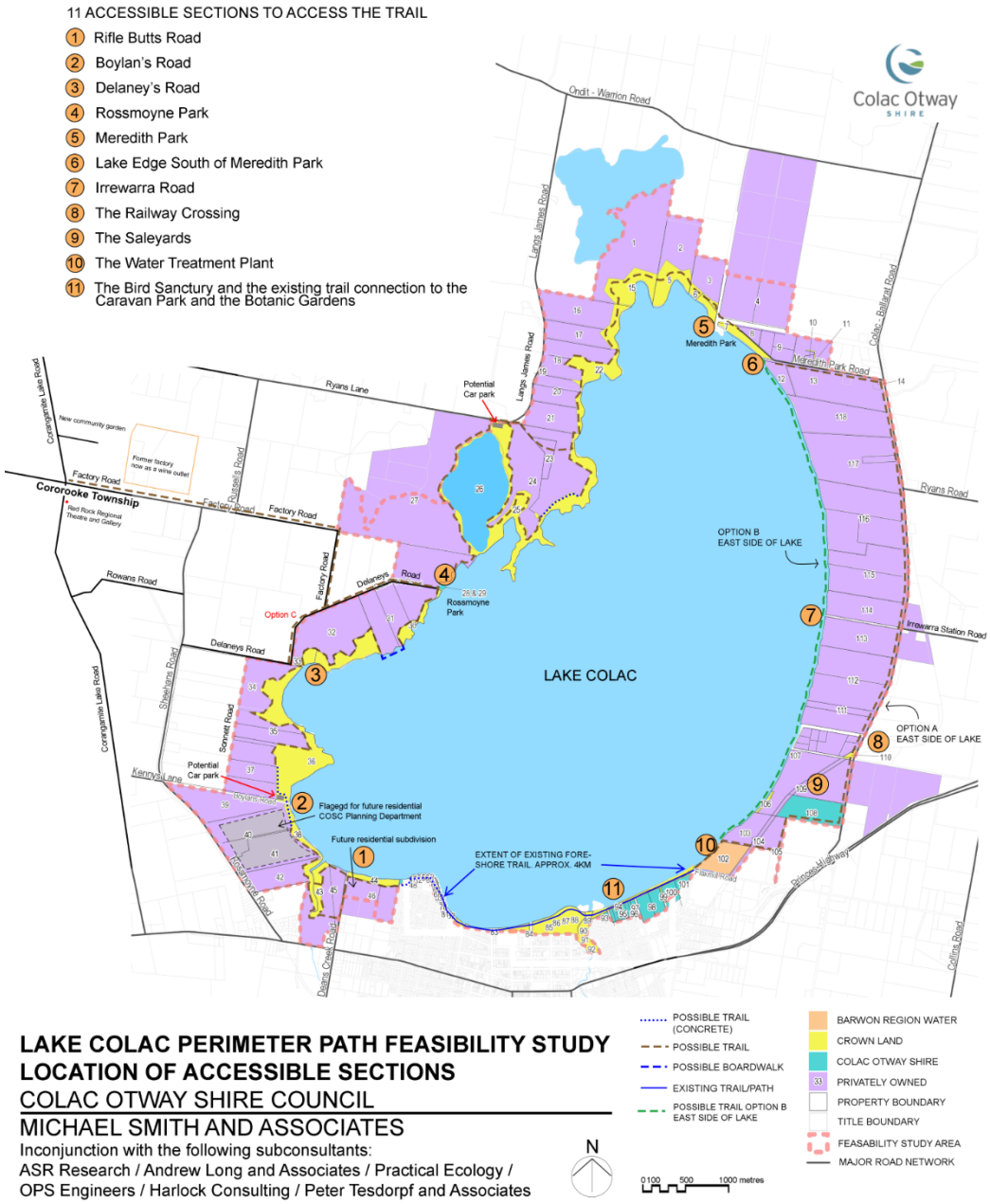
spanning across to the main lake, Barongarook Creek and a site south of Meredith Park Road. Future planning for the trail will require at least a Standard and possibly a Complex Cultural Heritage Study.

- Seasonal stone fish traps in the north of Lake Colac, while not currently registered Aboriginal places, will require further investigation and possible registration on the Victorian Heritage Register.

3.2.6 Access issues and constraints

An assessment was made of the physical accessibility of the lake and the potential barriers to/opportunities for a shared trail to be developed around the lake. The detailed findings of the assessment are provided in Appendix D. A summary is as follows:

- There are eleven (11) potential public access points to the lake. These are Rifle Butts Road, Boylans Road, Delaneys Road, Rossmoyne Park, Meredith Park, Lake Edge south of Meredith Park, Irrewarra Road, the Railway Crossing, the Saleyards, the Water Treatment Plant (only subject to fencing and agreement), the Bird Sanctury and the existing trail connection to the Caravan Park and the Botanic Gardens.



- The western side of the lake has existing Crown land allotments in all but two narrow allotments extending from Stodart Street Reserve to Meredith Park a distance of approximately 17.8 kilometres. As far as can be ascertained, the Crown land allotments came about as a result of the Department of Conservation Forests and Lands in the 1970s and early 1980s offering to buy back land above a certain Australian Height Datum (AHD) from property owners on the western side of the lake. It appears all but two property owners took up the offer. This provides opportunities to work with Parks Victoria, as the primary manager of the Lake Colac bed and banks, to plan a future path extension. Other stakeholders that would be included in discussions would be DEECA (as another land owner/manager) and Safe Transport Victoria, which is the water body regulator.
- The foreshore west of Stodart Street Reserve is flat and consists of pasture grass, weeds and in deeper water, Phragmites. The Rifle Club is currently considering other sites in the region to relocate its operations, as there will be incompatibility of the 600-metre-long rifle range adjacent to the planned future residential subdivision. The land currently occupied by the Colac Rifle Club is privately owned.
- Deans Creek is adjacent to the rifle range. The creek rises in farmland south of the Princes Highway and the highway is bridged over allowing the creek to connect. Inspection of the delta or outflow of Deans Creek into the lake, revealed it is quite wide in the order of 130 metres and would require a boardwalk to connect either side to the on-grade trail, if the trail was to follow the edge of the lake in this section.
- A more practicable option to a boardwalk crossing of Deans Creek is to extend the trail inland by approximately 300 metres from the lake, either side of the creek line and cross the creek at or near the existing timber bridge midway along creek between the delta and the Princes Highway. Another alternative is to have trail users walk along the existing Rifle Butts Road to the south, then cross the Deans Creek at an appropriate place before the path navigates back towards the lake. The main consideration is the numerous recorded sites of Cultural Heritage Value to both sides of Deans Creek. A CHMP and further discussions will need to be conducted with Traditional Owner groups.
- Due to the flat foreshore terrain to the entire section from Rifle Butts Road to Rossmoyne Park, there is a wide foreshore zone, an on-grade trail will be the most affordable solution, rather than the use of boardwalks. With the on-grade trail construction the most practicable approach is to sight the pathway within the upper reaches of the wide foreshore zone to reduce the occurrences or periods of water inundation. The less inundation by the lake's water level, the greater use the trail provides with less cost of restoration and on-going maintenance. The final location must be balanced with the consideration of immediate property owners and proximity of the trail to their livestock. In some places where private land extends to the waterline, there may be a need to either navigate inland or negotiate with landowners to purchase land or establish a lease/licence agreement for the use of a tract of land for the purposes of a path.
- Rossmoyne Park has significant amounts of basalt rocks scattered along its immediate foreshore edge. The rocks are home to the endangered Corangamite Water Skink. There are several registered sites of cultural heritage to the Rossmoyne Park foreshore.
- Rossmoyne Park has the potential to become a key destination place along the trail. It displays a distinctive promontory character of offering foreshore views in 180° from the slightly elevated location and an existing informal car park and small 30 x 20 metre grassed camping area. There are no picnic or toilet facilities at Rossmoyne Park, if the trail is constructed whether in stages or outright, facilities should be provided at the park. Rossmoyne Park is approximately 7.5 kilometres from Stodart Street Park which would provide a suitable one-way journey or a walking and cycling loop.

- Drakes Lagoon is a natural lagoon and off shoot to the lake. It is fed from Bullock Swamp Creek which rises to the lagoon's northwest and drains associated farmland. Investigation on site immediately south of the lagoon revealed a considerable length of delta of low-lying swamp land, to the outflow of the lagoon or intersection of the lake. While the lagoon and its interface to the foreshore is all Crown land the affordability and practicality of constructing several hundred metres of boardwalk to span the delta must be considered. Fortunately, the current property owner to the west side of Drakes Lagoon is in favour of the trail. Subject to an on-site meeting with that owner and inspection of the extensive levee banks constructed to reduce pollution of lake by the dairy processing plants in the 1950s or earlier, it may be possible to take the trail on high ground on the levee banks to the junction of Ryans Lane and Langs James Road with an option of running eastward to the lake through allotment 23 (subject to the owner's approval) to meet Crown land for the trail to skirt around the lake's north west section, across the northern tip and to Meredith Park.
- While some landowners at the northern end of Lake Colac have indicated they are not supportive of the trail, the proposed trail alignment would be located close to the water's edge along their properties on generally a wide Crown land allotment. The property owners who do not support the trail in this section commented on the extent of basalt rock outcrops being an impediment to the trail. The consultant team walked part of the northern portion without knowing precise Crown land boundaries. There are many grass/weed covered gaps between rock outcrops that would allow an on-grade curvilinear path on Crown land.
- If council was able to provide a trail from Stodart Street Reserve to Meredith Park, it would enable a one-way journey of 17.8 kilometres. Together with the existing four kilometres (approximately) of trail between Stodart Street and Clark Street, this would provide almost 22 kilometres of trail. It is noted that a half marathon is 21.097 kilometres. Achieving 22 kilometres of continuous trail may open up a variety of formalised recreation/events opportunities.

  The most straight forward route for the trail would be along the Colac-Ballarat Road from Meredith Park Road with land acquisition to the frontages of properties on Colac-Ballarat Road from Meredith Park Road to the Barwon Water Treatment Plan. That being said, there may be potential to locate the path system to the eroded eastern edge of the lake as a dual erosion control measure and pathway system. The need to ensure any future project did not compromise environmental and cultural heritage values would require extensive supporting studies to be undertaken. Due to the expense required in the planning and implementation phases, this would require a partnership approach potentially between all three levels of government as well as landowners and other important partners such as Traditional Owner groups. Parks Victoria, as the primary manager of the lake's bed and banks, confirmed that there is no current project that is considering erosion control measures along the east side of Lake Colac. During the inspections of the lake in August 2022, the lake was full of water and a walk along the eastern edge foreshore was not possible. Therefore, drone footage that was undertaken when the water level was lower, prior to 2022 reveals the distinct regimes and physiography of the foreshore, from beach-like gentle gradients to low cliff faces to the south.

3.2.7 Benefits and values of the trail

The trail will have the following recreation, health, social, tourism and economic benefits and environmental and educational values:

- Recreation – Sport and Recreation Victoria's 2018 study The Economic Impacts of Active Recreation in Victoria found that walking was the most popular form of physical activity, with Victorians spending 37 per

cent of their physical activity hours walking for health. The Ausplay National Sport and Physical Activity Participation Report 2023 shows that across Australia from July 2022 to June 2023, 19.1 million adults participated in physical activity, 5.6 million of these in non-sport related activities. For women, recreational walking was the most popular non-sport activity and for men, the second most popular activity. In Victoria, close to 3 million people aged 15+ participated in recreational walking on a regular basis. An extended Lake Colac trail will provide the Colac and district communities with additional free, open access places to walk and be generally active and engage with the environment. Consultation with local groups and individuals for the Hamilton to Coleraine Rail Trail Feasibility Study 2010 indicated that the proposed trail would attract individual and groups of walkers, runners and cyclists from the region. This trail has mostly been constructed apart from three trestle bridge crossings. It allows access to sections of the former railway line to enable trail users to undertake loops. It revealed that some would use the trail for organised group activities, others for casual individual activities. Examples of individuals and groups that would use the trail are people walking and jogging for pleasure or general fitness, people training for organised runs, exercise/bootcamp groups, local walking groups, local sporting groups using the trail as an alternative to running laps and locals and visitors enjoying the outdoors and the views, vegetation, and wildlife along the trail. Recreational cyclists and mountain bikers would also use the trail providing appropriate and safe trail widths could be achieved. Serious road cyclists prefer to ride on collector and arterial roads and highways because they dislike undulating terrain and often want to ride quickly, in large groups and over long distances. Ballarat City Council confirmed that the Ballarat to Skipton Rail trail was also used for these types of activities and that well-constructed accessible trails could expect to generate significant use. (Note: the several public access points to the western edge of the lake offer opportunities for short one way or loop journeys. They also provide accessible drop off and pick up stations along the trail).

- Health – VicHealth's 2015 Population Health Indicators survey found that Colac Otway Shire residents had high participation rates in physical activity and organised sport, the shire's obesity and rates of chronic health conditions such as asthma and high blood pressure are significantly higher than State averages. Trail-based activities offer many health benefits including improved cholesterol levels and protection against chronic diseases like cardiovascular disease, diabetes, and obesity. Outdoor exercise also can improve mood, restore attention, and decrease anger, depression, and stress. The Arthritis Foundation stresses the significant health benefits of walking – warding off heart disease, protecting bones and strengthening muscles, lightening moods, losing weight and lowering Alzheimer's risk etc. People will exercise – walk, run and cycle - when they use the trail. The feasibility study for the Hamilton to Coleraine Rail Trail 2010 and the experience of the Ballarat to Skipton and Murray to Mountain Rail Trails indicate that some of the exercise will be gentle with people walking along individually or in groups and frequently stopping along the trail to enjoy the environment. Others will exercise more vigorously, such as people exercising individually to improve fitness or participating in organised group exercise programs - boot camps, half marathons, and training for football, soccer, basketball, etc. The health benefits of these exercise programs can be considerable and particularly pronounced for the elderly where it has been shown that physical activity can significantly improve mood and prevent disabilities and chronic diseases. Maintaining physical mobility is important for middle-aged and elderly people in terms of muscle and bone health and structure, as people are living longer.
- Social – a trail would provide a range of social benefits to users. These include opportunities for friendship and social connection amongst trail users. Respect and understanding could grow between the people from different backgrounds and with diverse interests that are associated with the trail. Relationships between Council officers, relevant agencies and landowners will form and strengthen as they jointly advance the trail project. The trail will also help to connect the Colac, Cororooke and Coragulac

communities. People from these towns will interact on the trail and gain a greater understanding of each other's circumstances and communities.

- Environmental values – the lake has some significant environmental values. These include:
  - The lake is connected to the Kanawinka Geo-trail that extends across the basalt plains from Melton through the western district to the South Australian border.
  - There are many recent volcanoes (in geological times), and these are very evident throughout the district.
  - One of the legacies of the geology are the basalt lava flows that have cooled and cracked as open fissures and provide the habitat for the endangered Corangamite Water Skink. The basalt rocks are evident at Rossmoyne Park, the Parks Victoria-managed reserve centrally located on the western side of the lake. There are occurrences of low basalt rocks within Crown land and farmland to the lake's northern edge, extending to the very popular picnic and camping destination foreshore of Meredith Park.
- Educational values – the lake also has some significant educational values. These include:
  - There is general information specifically on the Corangamite Water Skink at Meredith Park. Other environmental attributes are the lake's fish and waterbirds. The proposed trail can very easily provide interesting and informative signage on the volcanic history, the western plains' significant biodiversity the RAMSAR significance of nearby Lake Corangamite, and Lake Colac's contribution to the biodiversity of the region. There are many waterbird species, some migratory as well that inhabit the lake, and some are on the endangered species list.
  - The lake has a rich history and heritage of Aboriginal occupation, with the lake being a significant water and food source. It also has a recent history since the 1850s of dairy farming, including the former dairy processing plant in Cororooke.
  - There is the opportunity to establish a "Friends of Lake Colac Group" to assist in the protection of cultural heritage and environmental/ecological values specific to the lake.

3.2.8 Assessment of economic value

- Economic and tourism – Active recreation is a significant contributor to the Victorian economy. About $8.3 billion is spent each year on recreation in Victoria. A Deakin Health Economics study commissioned by VicHealth found that making every Victorian adult physically active would deliver healthcare system benefits worth $245 million annually, and workplace production benefits worth approximately $3.1 billion over the lifetime of the Victorian population based on estimates of production lost due to people leaving work due to health-related death or disability. A similar study of Victoria's nature based outdoor economy in 2016 found that passive outdoor recreation activities contributed around $6.2 billion to Victoria's economy each year, supported 71,000 jobs, delivered annual avoided costs to the State's health care system of around $265 million and boosted workplace productivity by $720 million. A 2012 study by Tourism Victoria North East focusing on the Murray to Mountains revealed that recreational cyclists contributed around $26.2 million in regional output and $13.6 million in regional value per annum. A 2003 study on the Murray to Mountain Trail found that every visitor to the trail contributed $51 per day to the local economy. This demonstrates that investment in such a trail would deliver economic benefits beyond the construction phase of the project.

  A Lake Colac trail would encourage more people to recreate and thus reduce illness related costs. Sports/bike shops, bike repairers and sportswear shops could benefit from increased activity. As the trail and its attributes are closely physically linked with the Colac Botanic Gardens, the scenic vantage points such as the Botanic Gardens and Meredith Park could become better known to the broader community. They would assist in attracting people from outside the region. Potentially, accommodation may benefit

from a longer length of stay and increased patronage by walking groups, education groups, field naturalists nature-based groups and general tourists. Food and hospitality outlets in Colac and the nearby small townships may benefit from increased patronage and increased spend walker and cyclists. This has been the experience in Ballarat with respect to the Ballarat to Skipton Rail Trail.

Already the Cororooke community has established a community hub of a theatre and a soon-to-be constructed café/restaurant only 10 kilometres north-west of Colac and four kilometres by road to the trail along Factory Road. At Cororooke, a new open space park has recently been constructed by Council in partnership with the community, featuring four tennis courts, a picnic/barbecue area, a playspace and interpretive information. These new facilities in Cororooke will be a drawcard for some trail users to explore further.

- Tourism – While a perimeter trail around Lake Colac may not become a tourism attraction in its own right, it would enhance the overall tourism offering in the region. The 2016 study Victoria's Nature-Based Economy, commissioned by Sport and Recreation Victoria, estimated that residents and visitors to Victoria spent at least $7.4 billion each year on nature-based outdoor activities and equipment. The top expenditure and participant hours was in the walking, running and cycling category. In the Great Ocean Road tourism region, nature-based outdoor activity injected $1.1 billion of direct and indirect economic benefits. This indicates that there is potential for strong economic returns for investment in trail infrastructure at Lake Colac. People wanting to inject some exercise into their car holiday may find a short walk or ride very appealing, particularly when linked with the key popular destination camping and picnic area of Meredith Park and the Colac Caravan Park which has direct access to the existing trail to the foreshore's edge within the urban township residential grid. The trail has potential as a nature-based tourism destination as it has some interesting environmental values.

The We Conserve Group conducted studies into the economic benefits of 13 established walking trails across the USA. The key findings of the studies were as follows:

- Trails increase the value of nearby properties.
- Trails boost spending at local businesses. Communities along trails, often called trail towns, benefit from the influx of visitors going to restaurants, snack shops and other retail establishments. On longer trails, hotels, bed and breakfasts and outdoor outfitters benefit.
- Trails make communities more attractive places to live. When considering where to move, homebuyers rank walking and biking paths as one of the most important physical features of a community.
- Trails influence business location and relocation decisions. Companies often choose to locate in communities that offer a high level of amenities to employees as a means of attracting and retaining top-level workers. Trails can make communities attractive to businesses looking to expand or relocate - both because of the amenities they offer to employees and the opportunities they offer to cater to trail visitors.
- Trails reduce medical costs by encouraging exercise and other healthy outdoor activities.
- Trails provide transportation options and cut fuel expenses, offering reliable means of transportation for short distance trips. In the USA, nearly half of all car trips are less than 3 miles (5 kilometres) and more than a quarter are one mile (1.5 kilometres) or less.
- Trails provide low or no-cost recreation to families relative to other recreational services that could be provided by community clubs, Government or private recreation providers.
- Trails increase tax revenues in the communities in which they are located.

- The benefits lists above represent a significant economic return on the money invested into trail projects. The costs of land acquisition for trails, trail construction and maintenance are far outweighed by the economic benefits generated by trails.

3.2.9 Increasing popularity of walking

The most prevalent activity on the lake path will be recreational walking. Recreational walking is a very popular activity in Victoria and across the rest of Australia. It increased in popularity during the COVID period and, even though participation numbers have dropped post COVID, they still remain higher than the pre-COVID numbers. Some interesting statistics on recreational walking are as follows (Ausplay 2022):

- 45% or over 9 million Australians aged 15+ participate at least annually in recreational walking. 90% of these took part in recreational walking at least weekly.
- The peak participation by age is in the 54-64 and 65+ years age groups.
- Women 65+ are the largest age cohort in terms of participation.
- Of the States and Territories in Australia, Victoria has the 2nd highest participation rate in recreational walking, just behind Tasmania.
- 6.% of recreational walking across Australia is in organised groups.
- 47% of recreational walks are for 30-59 minutes and 29% for 60 to 89 minutes. 13% of walks are for 90 minutes or longer. The average walk time is 63 minutes.
- The participation rate in recreational walking across Australia pre-COVID was 43% of all Australian aged 15+ years.
- Recreational walkers participate in a range of other recreational activities, the most frequent being fitness/gym activities, swimming and cycling.

3.2.10 Recommendation

In the future, planning and detailed design process, a complete economic and business study is required to substantiate the economic and social benefits against the construction and ongoing maintenance costs.

4. POTENTIAL TRAIL LAYOUT

4.1 Introduction

The construction of the trail is highly likely to be undertaken in stages and there are several logical and functional sections that enable the trail to be properly constructed from an engineering infrastructure perspective, without compromising environmental and cultural heritage values and user safety or amenity.

There is an existing path system from Barwon Water's Colac Treatment Plant at the junction of Flaxmill Road and Clark Street extending west past the Colac Botanic Gardens to the western end of the Stodart Street Park. The distance of the existing path of varying construction components is approximately four (4) kilometres.

There are several public access points to the western side of the lake that make the logistics for staging the trail and enabling trail users; (walkers, cyclists, gopher scooters, wheelchairs and prams) to participate through undertaking manageable sections commensurate with their physical abilities, time and weather constraints, either as one-way journeys or loop journeys.

Below is the Consultant Team's assessment of the possible trail route to circumnavigate Lake Colac. There are a number of constraints i.e., land ownership, some landowners not supportive of the trail, the extent of Crown land, ecological and cultural heritage matters, which require further detailed review and consideration. This plan represents the most practical assessment of the possible trail route and sub options in a couple of locations for the trail, to enable the preparation of the physical components that form part of the feasibility study's key directions.

4.2 Proposed trail

The proposed trail is broken down into six sections - each with an approximate length of foreshore edge/roadside edge to enable cost planning.

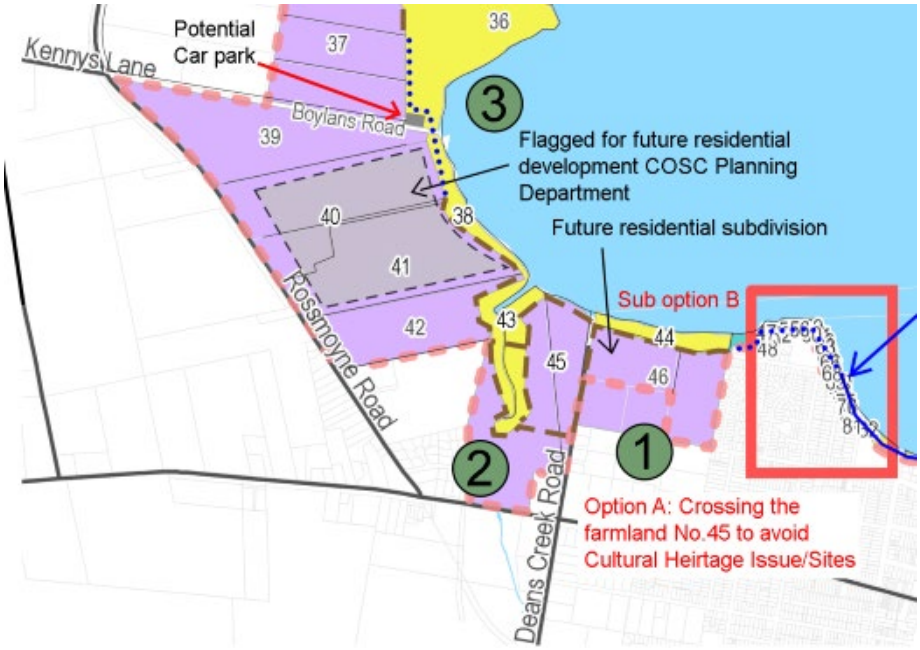
Section 1 - Stodart Street Park to West to Boylans Road

Concrete Path 0.4 kilometre in length, Gravel Path 3 kilometres in length

This section commences from the termination of the 1.8-metre-wide concrete path at the Stodart Street Park. A pit toilet associated with the existing trail is located several hundred metres east of Stodart Street Park. The section west of Stodart Street Park encompasses Rifle Butts Road which is a suitable access point to the trail once the rifle club relocates. A key change to this open grassed area will be the conversion of land to residential subdivisions either side of the Princes Highway. There is significant opportunity in the early structure planning of the subdivision's path networks to connect into the shared path trail and vice-versa. A proposed planning scheme amendment for land bordering Ross Street/Bilson Street/Stodart Street and Rifle Butts Road (known as the Colac West Development Plan Area) includes requirements for developers to maximise road frontage to the Lake Colac foreshore and an extension of the shared path along the foreshore (both subject to cultural heritage considerations).

Preliminary field research undertaken by the consultant team indicated that a boardwalk across Deans Creek delta would be an excessive cost. A more cost-effective method would be to upgrade the existing timber

bridge approximately mid-way from the Princess Highway to the delta. A path across the timber bridge would allow cross connections to the future residential subdivisions.



Property number	Land ownership	Type/Surface of trail	Trail route	Other comments
38	Crown allotment	2.5-metre-wide concrete path and 2.5-metre-wide gravel path	Within Crown land	A tract of Crown land exists between private land and the lake.
39	Private	2.5-metre-wide concrete path	On Crown land No.38, adjacent to No.39	Proposed formed access road to Boylans Road to a new car park on Crown land No.36.
40	Private	2.5-metre-wide concrete path	On Crown land No.38, adjacent to No.40	
41	Private	2.5-metre-wide gravel path	On Crown land No.38, adjacent to No.41	
42	Private	2.5-metre-wide gravel path	On Crown land No.43, adjacent to No.42	Alternatively, Council may consider seeking a concrete shared path as part of future subdivision/development plan process. The path should be integrated into the future subdivision network of connecting paths.
43	Crown allotment	2.5-metre-wide gravel path	Within Crown land	Will require a bridge across the creek, close to the existing timber bridge.
44	Crown allotment	2.5-metre-wide gravel path	Within Crown land	Council is seeking a concrete shared path along the Lake Colac

				Foreshore as part of the Colac West Development Plan that will connect with the existing foreshore path (if achievable above flood level).
45	Private	2.5-metre-wide gravel path	Across the property or alternatively along Lake's edge	Currently the rifle range. Area 45 is not likely to be Residential proximate to the Deans Creek/Colac interface. It is likely to be open space and wetlands. The pathway may need to alter its trajectory in this location. Cultural heritage considerations will take precedence.
46	Private	2.5-metre-wide gravel path	On Crown land No.44, adjacent to No.46	Future residential subdivision. Council is seeking a concrete shared path along the Lake Colac Foreshore as part of the Colac West Development Plan that will connect with the existing foreshore path (if achievable above flood level).

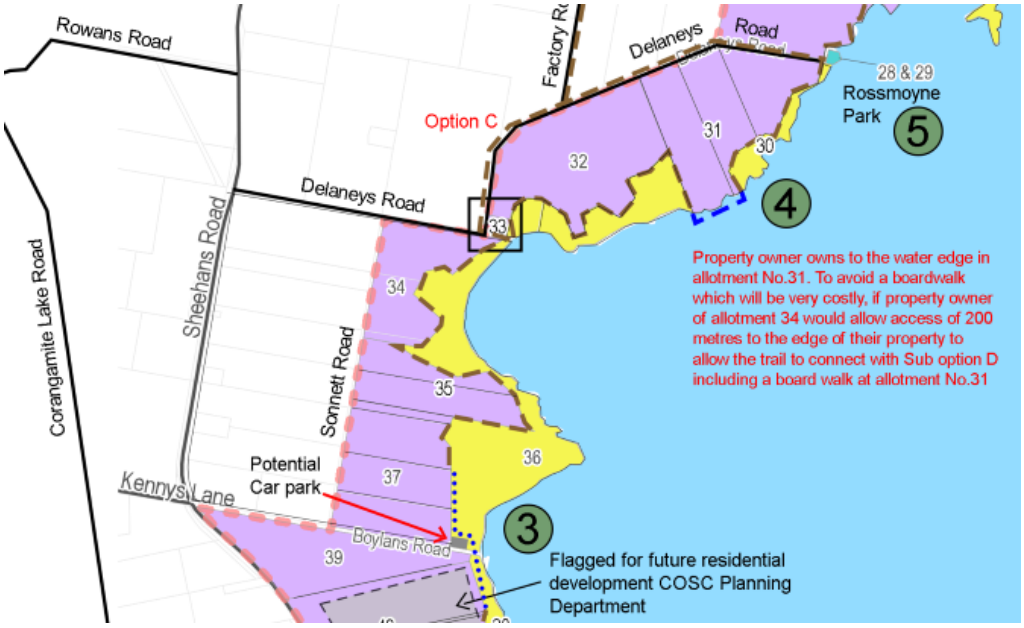
Section 2 - Boylans Road to Rossmoyne Park

Sub option should land acquisition or a boardwalk to allotment 31 not be achievable (route along Delaneys Road), Concrete path: 0.4 kilometre in length, Gravel path: 5.4 kilometres in length, Boardwalk: 0.4 kilometre in length.

Toward Boylans Road the lake's foreshore flattens out to almost an indiscernible slope. Boylans Road offers the opportunity to provide a 4-5 car park space close to the proposed trail and upgrade the 4WD access in, as a gravel track of 400 metres length thereby allow 2WD vehicles to access the proposed car park and the trail either side of Boylans Road. The extent of the shallow slope extends to allotment number 34 at which there is a transition from a shallow slope to basalt rock outcrops as reasonably regular clusters of rocks, but still negotiable by a curvilinear path. The presence of the Corangamite Water Skink to the rock outcrops will need to be investigated as a future ecological study.

Once at Rossmoyne Park there is a small Parks Victoria reserve, approximately 30x20 metres suitable for small group or individual camping. There is no toilet facility. Given its distance of approximately 8 kilometres to Stodart Street Park and Meredith Path of approximately 10 kilometres, a pit toilet facility should be considered at Rossmoyne Park if the path is extended to this area.

The key objective for the proposed trail in the immediate Rossmoyne Park area is to avoid disturbance of the Corangamite Water Skink, an extremely shy lizard that is easily disturbed by humans and dogs.



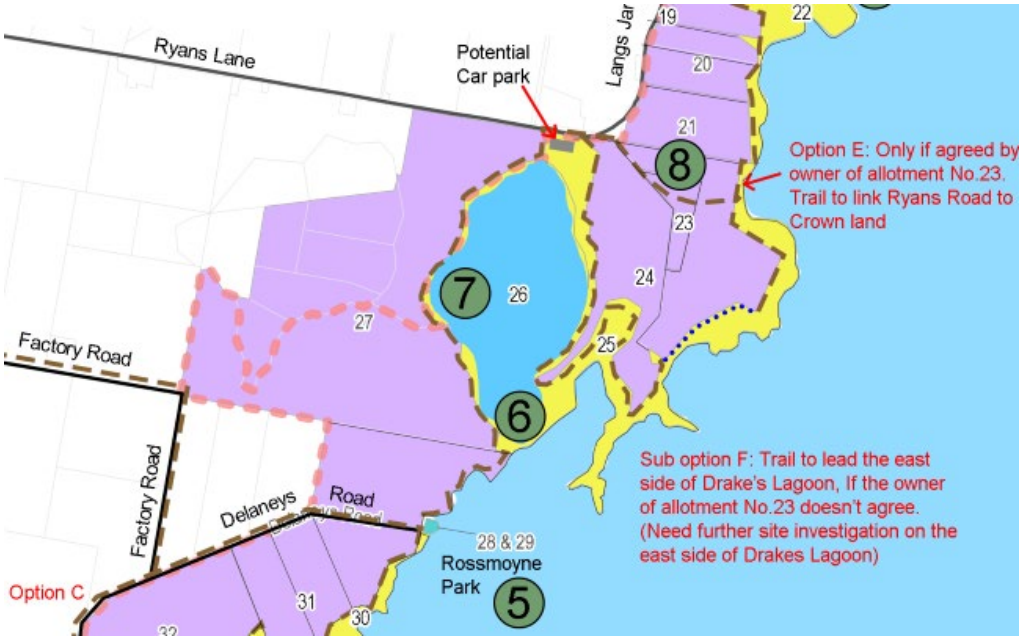
Property number	Land ownership	Type/Surface of trail	Trail route	Other comments
30	Crown allotment	2.5-metre-wide gravel path	Within Crown land	Alternative route along Delaneys Road.
31	Private	2.5-metre-wide boardwalk across banks with 2.5-metre-wide gravel path along Crown land No.30 boundary or alternatively 2.5-metre-wide gravel path along Delaneys Road	On Crown land No.30, adjacent to No.31	A boardwalk option would be very expensive. An alternative that could be explored is a route along Delaneys Road which would be subject to further negotiation.
32	Private	2.5-metre-wide gravel path	On Crown land No.30, adjacent to No.32	Alternative route along Delaneys Road.
33	Private	2.5-metre-wide gravel path	On Crown land No.30, adjacent to No.33	Alternative route along Delaneys Road.
34	Private	2.5-metre-wide gravel path	On Crown land No.36, adjacent to No.34	
35	Private	2.5-metre-wide gravel path	On Crown land No.36, adjacent to No.35	
36	Crown allotment	2.5-metre-wide gravel and 2.5-metre-wide concrete path	Within Crown land	A significant tract of Crown land exists between private land and the lake.
37	Private	2.5 metre gravel and 2.5-	On Crown	Proposed formed

		metre-wide concrete path	land No.36, adjacent to No.37	access road to Boylans Road to a new car park on Crown land No.36.

Section 3 - Rossmoyne Park to Drakes Lagoon

Gravel path: 3 kilometres in length

The section of trail north of Rossmoyne Park enters Drakes Lagoon (gravel path 3 kilometres) which is the outfall from Bullock Swamp Drain. Drakes Lagoon's edges have been modified to manage farming as part of the dairy processing plants established during the 1960s - 1970s. A constraint, yet opportunity for the trail is that the delta to the lagoon is very wide (several hundred metres) and the cost of construction of a boardwalk would be excessive. An appropriate and practical alternative to the boardwalk, is for a gravel trail to traverse along the man-made levee banks around the west side of the lagoon to the north tip to meet with Langs James Road, which would have a small car park constructed, accommodating 4 or 5 vehicles.



Property number	Land ownership	Type/Surface of trail	Trail route	Other comments
26	Crown allotment	2.5-metre-wide gravel path	Along the perimeter of Drakes Lagoon on Crown land No.25 boundary	
27	Private	2.5-metre-wide gravel path	On private property. Support from landowner. Subject to negotiation may involve land purchase or	The landowner is strongly supportive of trail and open to negotiation with Council on ways to establish a path through

			licence to pass over private land.	their property. The owner planted trees to the area over 35 years ago, so there is considerable amenity and habitat values to the levee banks.

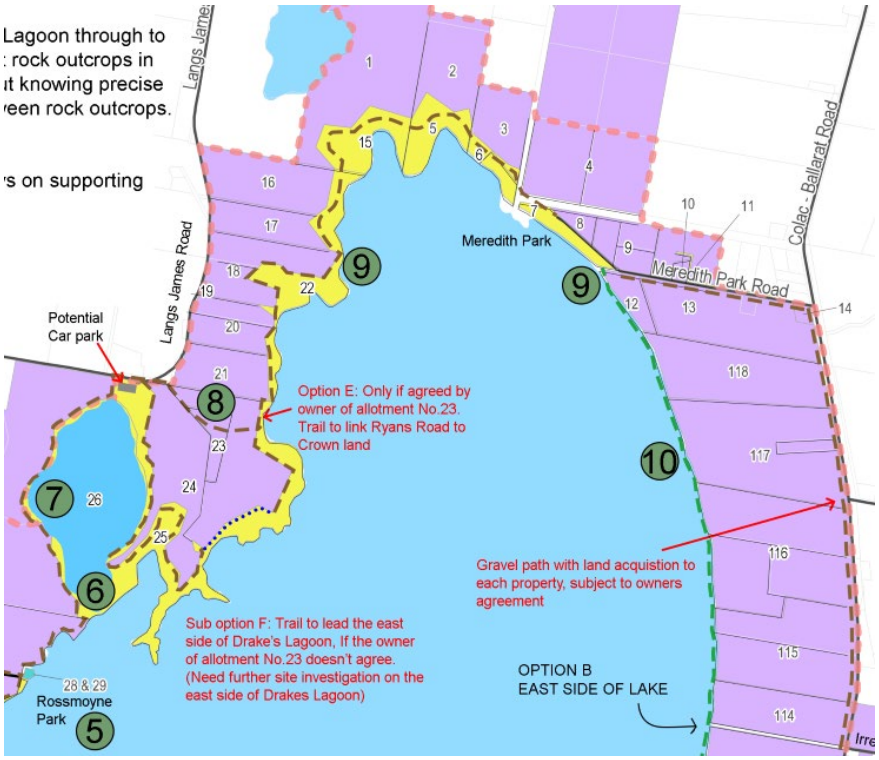
Section 4 - Drakes Lagoon to Meredith Park

Concrete Path: 0.58 kilometre in length, Gravel Path: 8.49 kilometres in length (some on existing levee banks)

From the northern end of Drakes Lagoon, the trail could extend east through private property allotment No. 23, or alternatively skirt around the east side of Drakes Lagoon to then continue on Crown land, for approximately 8 kilometres to Meredith Park. The route around the northern edge of the lake would traverse around low basalt rock clusters. Whilst it is noted that not all landowners are supportive of a trail in this section, due to the large tracts of Crown land between private properties and the lake, for the entire journey from, Drakes Lagoon to Meredith Park, the trail can run along the continuous corridor of Crown land, without impinging on private land.

At Meredith Park, there is an informal free camping ground along a strip of 150-200 metres of foreshore. Advice from several sources during the assessment stage of the feasibility study is that annually over the Christmas to New Year period the camping ground adjacent to the foreshore is full of caravans, motorhomes and tents. There are four pit toilets within a metal clad and framed building. There is no power supply to the caravan sites and there are several dated concrete picnic tables and seats. Meredith Park has substantial basalt rock outcrops to the north of the camping area and the rocks would be home to the Corangamite Water Skink. Meredith Park is the only developed picnic and leisure setting around the lake apart from the urban setting between the Barwon Water Colac Treatment Plant and Stodart Street Park.

Meredith Park is managed by Colac Otway Shire Council. Due to the popularity of the park at certain times of the year, if the trail does extend to Meredith Park the assessment of the demand for additional toilets would need to be undertaken. It is not possible to forecast the number of walkers and cyclists that would use the trail. Anecdotally, many walkers have been observed in the urban setting of the trail. On the basis of observations, the number of trail users for the new trail could be between 20-100 on weekdays and more on weekends and public holidays.



Property number	Land ownership	Type/Surface of trail	Trail route	Other comments
1	Private	2.5-metre-wide gravel path	On Crown land No.15, adjacent to No.1	A generous tract of Crown land exists between private land and the lake.
2	Private	2.5-metre-wide gravel path	On Crown land No.5, adjacent to No.2	A generous tract of Crown land exists between private land and the lake.
3	Private	2.5-metre-wide gravel path	On Crown land No.6, adjacent to No.3	A generous tract of Crown land exists between private land and the lake.
4	Private	2.5-metre-wide gravel path	On Crown land No.7, adjacent to No.4	
5	Crown allotment	2.5-metre-wide gravel path	Within Crown land	Inspection of this section of Crown land revealed a curvilinear path could avoid basalt rock outcrops.
6	Crown allotment	2.5-metre-wide gravel path	Within Crown land	Inspection of this section of Crown land revealed a curvilinear path could avoid basalt rock outcrops.
7	Crown allotment	2.5-metre-wide gravel path	Within Crown land	
8	Private	2.5-metre-wide gravel path	On Crown land No.7, adjacent to No.8	
9	Private	2.5-metre-wide gravel path along Crown land	On Crown land No.7, adjacent to No.9 and	

		No.7 boundary and 2.5-metre-wide gravel path through the property along Meredith Park Road	along Meredith Park Road	
15	Crown allotment	2.5-metre-wide gravel path	Within Crown land	A significant tract of Crown land exists between private land and the lake.
16	Private	2.5-metre-wide gravel path	On Crown land No.22, adjacent to No.16	A generous tract of Crown land exists between private land and the lake.
17	Private	2.5-metre-wide gravel path	On Crown land No.22, adjacent to No.17	A generous tract of Crown land exists between private land and the lake.
18	Private	2.5-metre-wide gravel path	On Crown land No.22, adjacent to No.18	A generous tract of Crown land exists between private land and the lake.
19	Private	2.5-metre-wide gravel path	On Crown land No.22, adjacent to No.19	A narrow tract of Crown land exists between private land and the lake.
20	Private	2.5-metre-wide gravel path	On Crown land No.22, adjacent to No.20	A narrow tract of Crown land exists between private land and the lake.
21	Private	2.5-metre-wide gravel path	On Crown land No.22, adjacent to No.21	A narrow tract of Crown land exists between private land and the lake.
22	Crown allotment	2.5-metre-wide gravel path	Within Crown land	A significant tract of Crown land exists between private land and the lake.
23	Private	2.5-metre-wide gravel path	On Crown land No.25, adjacent to No.23	Alternative route east-west across the property subject to the owner's agreement. A narrow tract of Crown land exists between private land and the lake.
24	Private	2.5-metre-wide gravel path and 2.5-metre-wide concrete path or alternatively across property No.23 if agreed by owner of allotment No.23	On Crown land No. 25 boundary, on Drakes Lagoon's existing levee banks	Alternative route across the property No.23, subject to No.23 owner's agreement. A tract of Crown land of varying widths exists between private land and the lake.
25	Crown allotment	2.5 metre wide concrete and 2.5-metre-wide gravel path	Within Crown land	

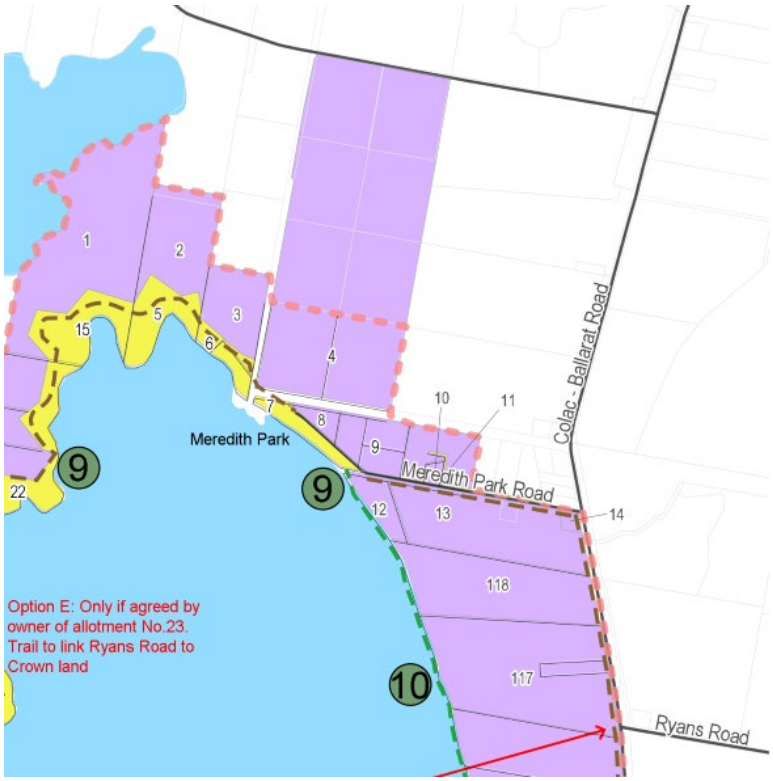
Section 5 - Meredith Park Road to Colac-Ballarat Road

Gravel path: 1.3 kilometres in length

Preliminary investigation and a visit to one farm property on the eastern side and a walk to the end of the Irrewarra Road Reserve Easement to inspect the lake's edge, revealed the significant erosion to the edge of the lake bank caused by wave action through the lake's surface water whipped up by strong south westerly, west and north westerly winds. It is not clear how much land has been lost over time, through erosion of farmland over many decades. In discussions with property owners who front on to the eastern edge of the lake, some do not support the trail for a number of reasons, mainly being loss of their privacy, people scaring cattle, access to private property and the cost of trail infrastructure.

This feasibility study has recommended that if Colac Otway Shire Council was to proceed with a path on the east side of the lake, it be established within the frontages of properties along the Colac-Ballarat Road. This is because the erosion issues along with the east side of the lake, coupled with land ownership that in many cases appears to extend almost to the waterline when the lake is at its fullest, would make a path both complex to build and negotiate with landowners.

That being said, there may be potential to locate a path system to the eroded eastern edge of the lake as a dual erosion control measure and pathway system. The need to ensure any future project did not compromise environmental and cultural heritage values would require extensive supporting environmental, cultural heritage and water management studies to be undertaken. Due to the expense required in the planning and implementation phases, this would require a partnership approach potentially between all three levels of government as well as landowners and other important partners such as Traditional Owner groups. Parks Victoria, as the primary manager of the lake's bed and banks, confirmed that there is no current project that is considering erosion control measures along the east side of Lake Colac. During the inspections of the lake in August 2022, the lake was full of water and a walk along the eastern edge foreshore was not possible. Therefore, drone footage that was undertaken when the water level was lower, prior to 2022 reveals the distinct regimes and physiography of the foreshore, from beach-like gentle gradients to low cliff faces to the south.



Property number	Land ownership	Type/Surface of trail	Trail route	Other comments
9	Private	2.5-metre-wide gravel path	On Meredith Park Road between the road seal and the property boundary to join Colac-Ballarat Road. Alternatively, the trail would terminate at Meredith Park unless Council decided to pursue the off-road option on the Colac-Ballarat Road.	
12	Private	2.5-metre-wide gravel path	On Meredith Park Road between the road seal and the property boundary to join Colac-Ballarat Road. Alternatively, the trail would terminate at Meredith Park unless Council decided to pursue the off-road option on the Colac-Ballarat Road.	
13	Private	2.5-metre-wide gravel path	On Meredith Park Road between the road seal and the property boundary to join Colac-Ballarat Road. Alternatively, the trail would terminate at	

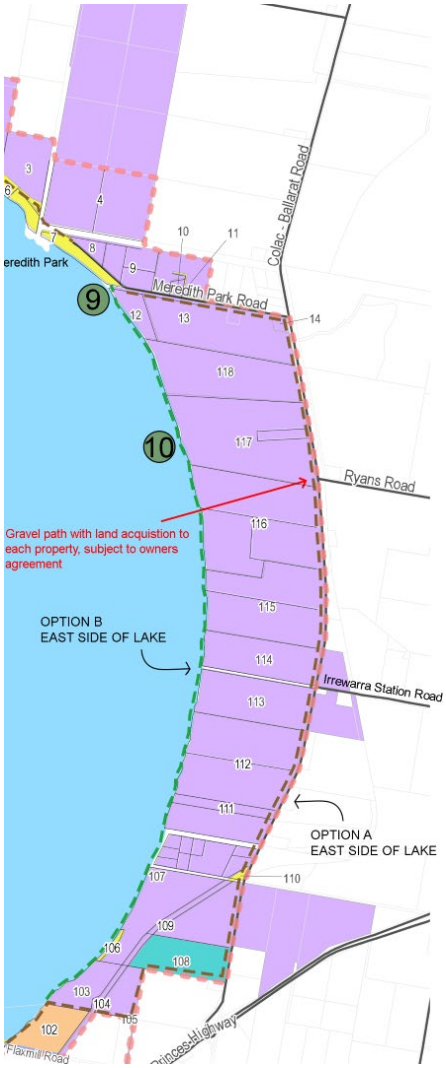
			Meredith Park unless Council decided to pursue the off-road option on the Colac-Ballarat Road.	

Section 6 – Colac-Ballarat (Beeac) from Meredith Park to Flaxmill Road

Gravel path: 7.5 kilometres in length

Unlike the west and north edges of the lake, the Crown land originally allocated to the eastern edge has been eroded away between Meredith Park Road through to Flaxmill Road with the exception of a short length on the foreshore edge close to the railway line. The only options to the eastern edge are land acquisition of a strip of land at the top of the embankment or toe of the embankment, or more feasibly, the acquisition of private land parallel to and against the fence line of the Colac-Ballarat (Beeac) Road. For this reason, a path on the east side of the lake is considered a lower priority than the west side. A path alongside the Colac-Ballarat Road alternative has been reviewed by the consultant team as a possible alternative as those property owners who object to the trail due to loss of privacy and scenic views of the lake were consulted as to their preference of the trail to the top of the embankment or to the toe of the embankment. Property owners may be less likely to object to the trail if the trail was to be located parallel to the Colac-Ballarat Road within the frontage of their properties. If Council wished to pursue a path on the east side of the lake, there would need to be a negotiated acquisition of a strip of between 6 to 9 metres of private land, or licence agreements, to facilitate at least a 9-metre width to allow the trail path to be at least 9 metres from the existing road seal in accordance with Regional Roads Victoria's (RRV) Safety Requirements. It is likely an ARMCO barrier rail would be required subject to further discussions with RRV.

Lessons learned by Council as part of the construction and ongoing management of the Old Beechy Rail Trail are important to note within this feasibility study, as they apply to negotiating land acquisition versus licence agreements to pass over private sections of land. Whilst purchasing private land is more expensive at the outset of a project, there are several significant benefits of this approach. This includes having secure tenure over the land the trail traverses in perpetuity as well as a simpler approach to insurance. Licence agreements require considerable management with landowners and can be tenuous in nature, particularly when properties change hands. Landowners at any time can end the licence agreement, resulting in sections of trail having to be closed temporarily or permanently. Given the significant expense associated with establishing a trail around Lake Colac, it is recommended that in the first instance land purchase be explored where necessary as a preference to licence agreements.



Property number	Land ownership	Type/Surface of trail	Trail route	Other comments
102	Barwon Water	2.5-metre-wide gravel path	Along the lake's edge	
103	Private	2.5-metre-wide gravel path	Inside the private property boundary	Land acquisition required
107	Private	2.5-metre-wide gravel path through the property boundary along Colac-Ballarat Road	Inside the immediate frontage of private property parallel to Colac-Ballarat Road	Land acquisition required
108	Colac Otway Shire Council	2.5-metre-wide gravel path	Inside the immediate frontage of private property parallel to Colac-Ballarat Road	
110	Crown allotment	2.5-metre-wide gravel path within Crown land boundary along Colac-Ballarat Road	On Crown land	

Property number	Land ownership	Type/Surface of trail	Trail route	Other comments
111	Private	2.5-metre-wide gravel path through the property boundary along Colac-Ballarat Road	Inside the immediate frontage of private property parallel to Colac-Ballarat Road	Land acquisition required
112	Private	2.5-metre-wide gravel path through the property boundary along Colac-Ballarat Road	Inside the immediate frontage of private property parallel to Colac-Ballarat Road	Land acquisition required
113	Private	2.5-metre-wide gravel path through the property boundary along Colac-Ballarat Road	Inside the immediate frontage of private property parallel to Colac-Ballarat Road	Land acquisition required
114	Private	2.5-metre-wide gravel path through the property boundary along Colac-Ballarat Road	Inside the immediate frontage of private property parallel to Colac-Ballarat Road	Land acquisition required
115	Private	2.5-metre-wide gravel path through the property boundary along Colac-Ballarat Road	Inside the immediate frontage of private property parallel to Colac-Ballarat Road	Land acquisition required
116	Private	2.5-metre-wide gravel path through the property boundary along Colac-Ballarat Road	Inside the immediate frontage of private property parallel to Colac-Ballarat Road	Land acquisition required
117	Private	2.5-metre-wide gravel path through the property boundary along Colac-Ballarat Road	Inside the immediate frontage of private property parallel to Colac-Ballarat Road	Land acquisition required
118	Private	2.5-metre-wide gravel path through the property boundary along Colac-Ballarat Road	Inside the immediate frontage of private property parallel to Colac-Ballarat Road	Land acquisition required
13	Private	2.5-metre-wide gravel path	On Meredith Park Road between the road seal and the property boundary to join Colac-Ballarat Road. Alternatively, the trail would	Land acquisition required, on the Colac-Ballarat Road frontage

Property number	Land ownership	Type/Surface of trail	Trail route	Other comments
			terminate at Meredith Park unless Council decided to pursue the off-road option on the Colac-Ballarat Road.	

In summary:
If the entire path was built, there would be:
Concrete path: 1.38 kilometres, Gravel path: 28.69 kilometres, Boardwalk: 0.4 kilometre
Exclusions: Rossmoyne Park to Cororooke Township via the side of Delaneys Road, Factory Road (north south) and Factory Road East West. Assumed gravel trail. 5kms

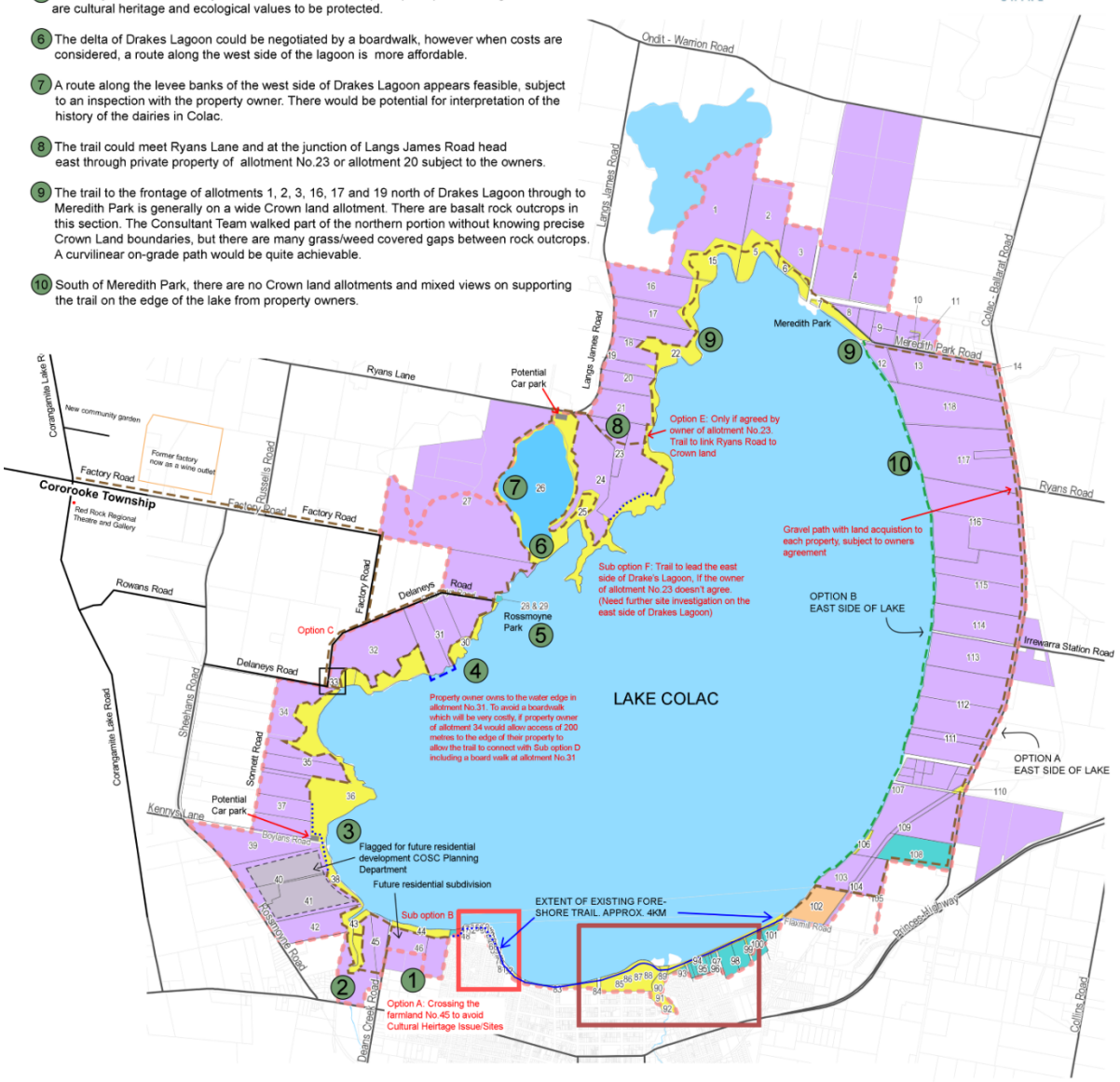
Note: Further investigation of the Irrewarra Road Sourdough Bakery as a potential destination is required, if the eastern segment is pursued for the trail.

Following the consultation and engagement period, further advice from a landholder included the suggestion to trial a shorter stretch of revetment walling to determine its suitability and function in erosion control if the eastern segment is pursued.

Figure 4 – Potential Path Layout

NOTES TO PLAN NUMBERS

1. Future residential subdivision and potential for the subdivision's path network to connect to the trail.
2. Deans Creek and delta outflow to the lake. Optimum route is to skirt either side upstream of the creek to the area of the existing timber bridge and cross the creek. Potential rest area and interpretive information.
3. Boylans Road Potential car park mid-way along the road. Low lying land, the on-grade trail needs to be as on high ground to avoid inundation in high rainfall events.
4. Property owner owns property to the water edge allotment No.31 objects to the trail. To avoid a boardwalk which property owners don't favour due to loss of boat access to the lake the option is, if property owner of allotment No.34 would allow access of 200 metres to the edge of their property to allow the trail to connect with Delaneys Road, this would provide access on an earthen road to then Factory Road, then onto Rossmoyne Park Road to provide road access to Rossmoyne Park a total distance of approximately 2.5 kilometres.
5. Rossmoyne Park is currently a Parks Victoria informal open space/park with a grassed area of 30X20 metres and room for several vehicles. There are cultural heritage and ecological values to be protected.
6. The delta of Drakes Lagoon could be negotiated by a boardwalk, however when costs are considered, a route along the west side of the lagoon is more affordable.
7. A route along the levee banks of the west side of Drakes Lagoon appears feasible, subject to an inspection with the property owner. There would be potential for interpretation of the history of the dairies in Colac.
8. The trail could meet Ryans Lane and at the junction of Langs James Road head east through private property of allotment No.23 or allotment 20 subject to the owners.
9. The trail to the frontage of allotments 1, 2, 3, 16, 17 and 19 north of Drakes Lagoon through to Meredith Park is generally on a wide Crown land allotment. There are basalt rock outcrops in this section. The Consultant Team walked part of the northern portion without knowing precise Crown Land boundaries, but there are many grass/weed covered gaps between rock outcrops. A curvilinear on-grade path would be quite achievable.
10. South of Meredith Park, there are no Crown land allotments and mixed views on supporting the trail on the edge of the lake from property owners.



LAKE COLAC PERIMETER PATH FEASIBILITY STUDY
POTENTIAL PATH LAYOUT

COLAC OTWAY SHIRE COUNCIL

MICHAEL SMITH AND ASSOCIATES

Inconjunction with the following subconsultants:
ASR Research / Andrew Long and Associates / Practical Ecology /
OPS Engineers / Harlock Consulting / Peter Tesdorpf and Associates

N

- POSSIBLE TRAIL OPTION B EAST SIDE OF LAKE
- POSSIBLE TRAIL (CONCRETE)
- POSSIBLE TRAIL (GRAVEL)
- POSSIBLE BOARDWALK
- EXISTING TRAIL/PATH

0 100 500 1000 metres

- BARWON REGION WATER
- CROWN LAND
- COLAC OTWAY SHIRE
- PRIVATELY OWNED
- PROPERTY BOUNDARY
- TITLE BOUNDARY
- FEASABILITY STUDY AREA
- MAJOR ROAD NETWORK

4.3 Opinion of Probable Costs

The preliminary opinion of probable costs estimates for the trail (as described and illustrated above) are provided in the following tables and text. (Note: The costs are presented in full in this draft report. In the final report, a lot of this detail will move to the appendices and a short summary of costs will remain in the main body of the report).

4.3.1 Further research and assessments

Ecological assessment (Opinion of Costs from Practical Ecology)

Task	Estimated Days	Sub-total
Detailed site assessment for native vegetation and habitat As the general route for the shared trail has generally been considered in the feasibility study the likely corridor will need to be assessed for native vegetation and habitat values by a qualified ecologist. A general corridor, possibly 30-50 m wide should be assessed and mapped first done concurrently with targeted assessments of threatened fauna species.	12	$14,400
Targeted assessment of migratory birds As found in the preliminary ecological assessment migratory birds protected under the Environment Protection and Biodiversity Conservation (EPBC) and Flora and Fauna Guarantee (FFG) Acts are potentially impacted by the proposed shared trail. A specialist zoologist will need to conduct bird surveys in different sections of the shoreline with different conditions and report on existing bird use and consider possible impacts of the shared trail on listed species. The report should document the potential impacts and provide recommendations for design to minimise impacts. These estimates are based on 4 quarterly assessments over a year, likely supported by boat, with report writing.	12	$24,000
Targeted assessment of Corangamite Water Skinks The Corangamite Water Skink is possibly the most important fauna species to consider for any ecological assessment. The populations on the Lake Colac shoreline are among the most important populations still extant and it is easily disturbed by people in its preferred about on stony rises along water's edge. A survey of habitat and distribution should be undertaken by a herpetologist resulting in a report describing current populations and providing recommendations for trail design to avoid impacts and mitigate any impacts if necessary. Based on 4 field days and 8 days report writing. **note additional study outlined at the base of this table.	16	$19,200
Trail Design Collaboration It is essential that the trail is designed in response to the requirements in the Colac Planning Scheme in avoiding and minimising native vegetation and habitat impacts. After the three steps detailed above are completed as draft detailed designs for the trail are developed a clear effort of collaboration between the ecologists and other design professionals should occur. A documented process of integrated design is essential to developing the best possible design balancing all issues and obtaining planning approval. Based on 2 or 3 ecologists or zoologists collaborating with trail designer	3	$3,600
Development of final report supporting planning permit application Once a collaborative design process is completed with a preferred design the contracted ecologist needs to finalise their report, with a site description, analysis of impacts, recommended mitigation actions, estimated offsets etc, to support the application for the proposed shared trail. Based on developing integrated across all issues.	16	$19,200
Estimated Total excluding GST		**$80,400**

Specific conservation study for the Corangamite Water Skink

Survey of the Corangamite Water Skins colonies between Rossmoyne Park and Meredith Park. There will be need for State Government Flora and Fauna Guarantee Act and Federal Government Environment Protection and Biodiversity Conservation Referrals. Allow for field surveys, reporting and referral applications $150,000.

Aboriginal Cultural Heritage Management Plan (opinion of costs from Andrew Long and Associates)

Scope

On the basis of existing information, a program of stakeholder consultation, desktop, field survey and subsurface testing is recommended to:

1. Establish the presence or absence of Aboriginal cultural heritage places within the activity area.
2. Determine the potential impact of proposed works on any Aboriginal cultural heritage places.
3. Formulate mitigation measures that may reduce any impact.
4. Reduce the risk of unexpected discovery of Aboriginal cultural heritage places during the construction phase.
5. Develop contingency arrangements for managing such discoveries during construction.

The specific scope of works will consist of the following:

- Notification and Consultation – a formal Notification of Intent to Prepare a CHMP would be submitted to the Registered Aboriginal Party (RAP) and Aboriginal Victoria (AV), Department of Premier and Cabinet (DPC), followed up by preliminary consultation with relevant Aboriginal stakeholder groups.
- Desktop Assessment – an assessment of previous studies will be undertaken to verify the existing conditions, review any subsequent changes and develop a provisional methodology to evaluate the activity area.
- Standard Assessment (Field Survey) – the activity area will be the subject of a field survey in co-operation with representatives of the relevant RAP(s), RAP applicant(s) or Traditional Owner Group(s) to meet the requirements of a Standard Assessment. The Standard Assessment will assist in locating where the Complex CHMP will take place.
- Complex Assessment (Test Excavation) – A testing programme will be undertaken to provide an indicator of the presence/absence of archaeological heritage at priority locations). This may include 0.5x0.5m test pits and 1x1m test pits, mechanical excavation or other works that are required. Representatives of the relevant RAP(s), RAP applicant(s) or Traditional Owner Group(s) will be involved in this process. This provision allows for at least five (5) 1x1m controlled test excavation as required to establish stratigraphy in different landforms and one (1) 0.5x0.5m test pit at intervals of 100 metres. Additional complex assessment will likely be required.
- CHMP Reporting – a CHMP will be prepared according to the Aboriginal Heritage Regulations 2018, the AV approved form and the Guide to Preparing Aboriginal Cultural Heritage Management Plans (October 2016). This includes the preparation of the CHMP, client liaison and our costs for consultation with the relevant RAP(s), RAP applicant(s) or Traditional Owner Group(s) and assumes that an in-principle agreement for the management of Aboriginal cultural heritage places can be reached prior to lodgement of the CHMP.
- Should it be decided to undertake both a Standard and Complex CMHP assessment between Deans Creek and Meredith Park, the percentage cost would be 70% of the subtotal figure of $796,244 excluding GST.

Path Construction (opinion of costs from Harlock Consulting)

Overall

Description	%BC	Subtotal	Total
Preliminaries, overheads and profit	6.46%		2,228,799
Concrete pathways	3.00%	1,034,500	1,034,500
Gravel pathways	22.07%	7,620,250	7,620,250
Boardwalks	3.48%	1,200,000	1,200,000
Retaining walls	0.43%	150,000	150,000
Fencing -, electrified farm fencing	6.24%	2,154,900	2,154,900
Swale drains	5.62%	1,939,000	1,939,000
Accessible car parks	0.12%	40,000	40,000
Signage	0.43%	150,000	150,000
Bins	0.06%	20,000	20,000
Seating	0.22%	75,000	75,000
Picnic tables	0.12%	42,000	42,000
Shelters	0.51%	175,000	175,000
Toilets	0.30%	105,000	105,000
SUBTOTAL	49.06%		16,934,449
Design and construction contingency (15%)	7.36%		2,540,167
TOTAL ESTIMATED COSTRUCTION COSTS	56.41%		19,474,616
Cultural Heritage Standard and Complex CMHP, including Aboriginal RAP fees – cost for attendance onsite during CHMP investigations (95 days with 2 people)	2.31%	796,244	796,244
Surveying – Feature and levels around the entire foreshore	0.23%	80,000	80,000
Boundary re-establishments	0.09%	30,000	30,000
Professional fees Design, project management, geotechnical reports, etc	2.17%	750,000	750,000
Land acquisition (particularly if eastern path is pursued).	2.90%		1,000,000
Ecological Assessment – flora and fauna	0.23%	80,400	80,400
Corangamite Water Skink Conservation Survey and Assessment FFG and EPBC Referrals	0.43%	150,000	150,000
Council resources – Preparation of tender specifications (for ecological assessment, cultural heritage investigations, resurveying, boundary re-establishments, feature and level surveying, geotechnical investigations, detailed design). – Tender advertising and evaluations – Consultant/contractor management – Community engagement with all private and public landowners to access properties as required. – Negotiation of land ownership/purchase/transfer/lease/licence arrangements with public and private landowners as required	0.72%		250,000
Cost escalation – 12 months @ 4% per annum	2.63%		909,515
TOTAL ESTIMATED BASE PROJECT COST	68.14%		23,520,876
Option - Armco barriers and roadside shoulder adjustments	17.38%	6,000,000	6,000,000
Option - Double fence and planting barrier between land and pathway	0.00%		Cost neutral as alternative to

Description	%BC	Subtotal	Total
			above option
Annual maintenance costs - average annual cost for first 10 years		190,000	
Exclusions:			
GST			
Cost premiums for staging of the works into Separable Portions			
Adverse ground conditions			
Contamination testing and reporting			
Path from Rossmoynes Park to Cororooke Township			
Tree planting or tree removal			
TOTAL ex GST	100%		29,520,775

Refer to Appendix F for the Opinion of Probable Costs for individual elements.

4.3.2 Potential Staging and Construction (estimates of costs from Michael Smith and Associates)

The planning, design and construction of the entire new trail of 30.5 kilometres is in the order of $29,520,775, as if undertaken and constructed in 2024. This is a high cost and the trail will certainly have to be implemented in stages and may take several years to fully complete construction.

As described in this report, the existing trail currently terminates at Stodart Street Park and from this location, the new trail can extend to Drakes Lagoon and to Meredith Park in quite manageable sections or stages. Accessible points are Rifle Butts Road, Boylans Road, Rossmoyne Park, including Delaneys Road and the north side of Drakes Lagoon at the intersection of Ryans Lane and Langs James Road. Refer to the map of the proposed trail noted as "Potential Path Layout" on page 48.

In order to provide staged sections for cost planning and funding purposes, the sections around the 30.5-kilometre perimeter of the lake are divided into six sections. Each is then allocated on a pro-rata basis back to the Opinion of Probable Cost of $29,520,775. The section of trail from Meredith Park to the Barwon Water Colac Water Treatment Plant has a considerable site-specific cost of $6 million of ARMCO barrier railing and roadside shoulder adjustments over 7.5 kilometres and will include the trail's surfacing, property barrier fencing, and land acquisition costs, resulting in this section of the trail being at a higher cost, than the remaining 21.7 kilometres of trail. It is then realistic to apportion costs for the first five sections of trail on a pro-rata basis as a percentage of the $29,520,775 of the 30.5 kilometres. This equates to $967,894 per kilometre. An option to build an over-water boardwalk or other dual path/erosion control measures along the east side of the lake has not been costed, as this is beyond the scope of this feasibility study.

Also note that as residential development occurs in the Colac West development corridor, Council can negotiate developer contributions for section 1 – Stodart Street to Boylans Road. However, for the purposes of this feasibility study, costs for the entire lengths have been estimated.

OPTION A –

Section	Description	Length in kilometres	Cost
1	Stodart Street Park-West to Boylans Road	3.4	3,290,840
2	Boylans Road to the corner bend of Delaneys Road:	3.1	2,500,000
3	The corner bend of Delaneys Road to Rossmoyne Park:	3.1	3,500,944
4	Intersection of Delaneys Road and Factory Road to Cororooke:	To be confirmed	To be confirmed
5	Rossmoyne Park to Drakes Lagoon:	3.0	2,903,683
6	Drakes Lagoon to Meredith Park:	9.1	8,807,838
7	Option A – Colac-Ballarat Road from Meredith Park Road to Flaxmill Road, via Meredith Road to Colac-Ballarat Road	8.8	8,517,470
	Option A Totals	30.5	**29,520,775**

OPTION B –

Section	Description	Length in kilometres	Cost
1	Stodart Street Park-West to Boylans Road	3.4	3,290,840
2	Boylans Road to the corner bend of Delaneys Road:	3.1	2,500,000
3	The corner bend of Delaneys Road to Rossmoyne Park:	3.1	3,500,944
4	Intersection of Delaneys Road and Factory Road to Cororooke:	To be confirmed	To be confirmed
5	Rossmoyne Park to Drakes Lagoon:	3.0	2,903,683
6	Drakes Lagoon to Meredith Park:	9.1	8,807,838
7	Option B – Eastern side foreshore:	6.8	25,149,257
	Option B Totals	28.5	**46,152,562**

5. CONSOLIDATED OPPORTUNITIES AND CONSTRAINTS

Below is Council and consultant team's assessment of opportunities and constraints the trail presents:

Opportunity	***Constraint***
Realise a long-held ambition by the community to enhance recreation and tourism opportunities associated with Lake Colac.	
	Ensuring accurate flood mapping is incorporated into detailed design to ensure the path is constructed above the high water level.
Path planning and implementation provides opportunities to identify, protect and conserve Aboriginal cultural heritage and values in partnership with Traditional Owners	*The path will traverse areas known to be sensitive for cultural heritage and values, which must be protected as a priority.*
Opportunities to protect and enhance biodiversity values through revegetation	*The need to protect rare and threatened species, including the Corangamite Water Skink. Investigation by field surveys and conservation management of the Corangamite Water Skink, likely FFG and EPBC Referrals.*
Majority Crown land ownership on the western fringes of the lake. Resurveying will help Crown land managers, Parks Victoria and DELWP re-establish an understanding of exact land boundaries for future management.	*Small sections of private ownership to the waterline on the west side of the lake will require further negotiation with landowners, including consideration of land purchase/acquisition as an option. May require consideration of a Public Acquisition Overlay (PAO).*
Major opportunities on the western side of the lake to create short trips/loops using Boylans, Delaneys and Factory roads, and potentially linking through to Cororooke. Short loops and easily accessed points provide opportunities for elderly people, young families and less mobile participants in undertaking manageable sections.	
Opportunity to establish a path alongside the Colac-Ballarat Road as an alternative, if there was community/Council support for such an approach.	*Erosion on the east side of the lake, coupled with land ownership to waterline, would make a perimeter path challenging and costly to build/negotiate.*
Opportunity to work with land developers to include various path networks as part of the various subdivision plans between Stodart Street and Rifle Butts Road, and Rifle Butts Road to Boylans Lane.	
Opportunity to work with G21 and other partners to lobby for priority project status/government funding for a project that will benefit future generations of our community.	*Initial investigations and construction will be costly.*
Existing trail from Flaxmill Road to Stodart Street is approximately 4 kilometres. Distance between Stodart Street and Meredith Park on west side is approximately 17.8 kilometres. Combined this would provide almost 22 kilometres of trail, equivalent to a half-marathon.	
Opportunity to engage with and educate the community on the particular environmental and ecological values of the lake to potentially establish a "Friends of the Lake Group".	
With the construction of the trail in stages, there is the opportunity to establish branding and theme interpretive, wayfinding and distance marker signage, including	

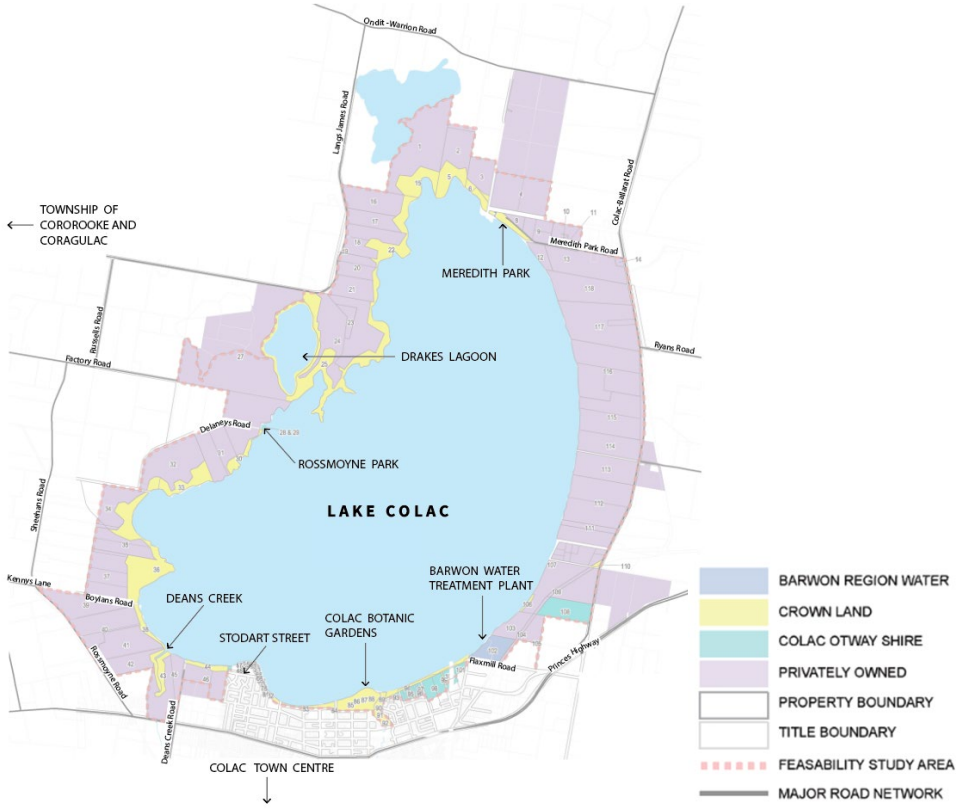
Opportunity	***Constraint***
replacement of existing signage on the existing trail between Flaxmill Road and Stodart Street.	
Build on local businesses and sites. The Cororooke hamlet has recent significant improvements and facilities to attract visitors. The Colac Caravan Park and Botanic Gardens are established attractions, that should link to marketing Colac and the trail.	

APPENDICES

Appendix A – Community Exhibition Information

LAKE COLAC PATH FEASIBILITY STUDY

BACKGROUND



Since the late 1990's many members of the local Colac community, including the Cororooke community, have supported the extension of the existing 5 kilometre long path to the perimeter of Lake Colac, currently spanning between the Barwon Water Treatment Plant to the east and Stodart Street Park to the west. Additionally, the Colac 2050 Growth Plan and Council's Lake Colac Foreshore Master Plan, advocate for a walking and cycling path around the perimeter of Lake Colac.

Lake Colac is a valuable regional asset offering water-based activities to the local community, clubs, and sporting groups. Despite its potential, it is generally considered under-utilised and could enhance community connections through recreation and exercise, while also boosting Colac's economy and tourism.

Michael Smith and Associates were engaged by Council to assess the feasibility of the path extension. The feasibility study determined that the construction of a perimeter path is possible, however the Opinion of Probable Costs (Augst 2024) for the entire path extension to be $47.5 million.

The substantial cost of the project is a result of several factors. Overtime, wind driven wave action from prevailing north-westerly and south-westerly winds has significantly eroded the original allocated Crown land to the eastern edge of the lake, with only the western edge and a limited width of the northern edge remaining as Crown land for public access. To address the complex land ownership arrangement to the eastern edge, the Consultant Team has recommended a rock revetment and reinforced concrete path to the eastern edge of the lake between Meredith Park and the Barwon Water Treatment Plant. This is a significant cost which makes up almost half of the total of the Opinion of Probable Costs sum, and is considered unfeasible.

Preliminary consultation and initial cultural heritage and environmental studies have been undertaken as part of the feasibility study. These studies indicated that further detailed investigations will need to be undertaken as the project progresses, to ensure the protection of the existing cultural heritage and environmental values present along the Lake Colac edge.

Colac Otway SHIRE

MICHAEL SMITH & ASSOCIATES

Colac Otway Shire / P: (03) 5232 9400 / www.colacotway.vic.gov.au

LAKE COLAC PATH FEASIBILITY STUDY

WESTERN SIDE

Visualisation of the proposed gravel path extension near Delaneys Road

Factors requiring further detailed planning/investigation:

Cultural Heritage Investigations	✓
Ecological Investigations	✓
Hydrological Investigations	✓
Land Owner Consultation	✓
Funding Opportunities	✓

The Opinion of Probable Cost for further detailed planning and investigation required for the western side of Lake Colac is approximately $2.25 million

BARWON REGION WATER
CROWN LAND
COLAC OTWAY SHIRE
PRIVATELY OWNED
PROPERTY BOUNDARY
TITLE BOUNDARY
FEASABILITY STUDY AREA
MAJOR ROAD NETWORK
EXISTING PATH
POSSIBLE PATH (GRAVEL)
POSSIBLE PATH CONNECTION TO CORORROOKE (GRAVEL)
POSSIBLE PATH (CONCRETE)
POSSIBLE BOARDWALK

The extension of the path along the western side of Lake Colac appears to be the most promising section for delivery. However, its feasibility remains subject to further detailed investigation, planning and funding availability. The proposed path route is largely located within the Crown land reserve, linking Stodart Street Park to Deans Creek, Boylans Road, Rossmoyne Park, and beyond to Drakes Lagoon and Meredith Park, a distance of approximately 22 kilometres.

The western edge of Lake Colac offers the most viable opportunity for a stage path extension, with promising future potential to connect the nearby townships of Cororooke and Coragulac.

The proposed extension would also link emerging residential growth areas – particularly around Deans Creek and Colac West – with the lake's edge. As a practical starting point for the broader trail network, this section presents a compelling prospect for early delivery. Council has the opportunity to collaborate with developers, including through development contributions, to extend the pathway from Stodart Street to Boylans Road.

The western edge of the lake also has several local roads that provide vehicle access to the lakes edge between Stodart Street Park and Drakes Lagoon, including Boylans Road, Delaneys Road and Langs James Road. These local roads would give people the option to walk or ride shorter sections of the path, depending on how much time or energy they have.

Findings from the feasibility study confirmed the significant cultural heritage and environmental values present to the western side of Lake Colac's edge, including the presence of important habitat to the endangered Corangamite Water Skink. Further detailed investigations would require funding to understand the impacts of the path extension, and the required Responsible Authority approvals, consents, referrals and management agreements regarding cultural heritage, ecological, water and stormwater management matters. Ongoing consultation with abutting land owners will be important as the project progresses.

Colac Otway SHIRE

MICHAEL SMITH & ASSOCIATES

LAKE COLAC PATH FEASIBILITY STUDY

EASTERN SIDE

Visualisation of the proposed concrete path on a rock boulder revetment wall, Option B

Factors that require further detailed planning/investigation:

Cultural Heritage Investigations	✓
Ecological Investigations	✓
Geotechnical Investigations	✓
Land Owner Consultation	✓
Land Acquisition (Option A)	✓
High Cost	✓
Funding Opportunities	✓
Hydrological Investigations	✓

The Opinion of Probable Cost for further detailed planning and investigation required for the eastern side of Lake Colac is approximately $1.8 million

The Consultant Team explored three potential options for extending the path along the eastern edge of Lake Colac to complete the perimeter loop. While the feasibility study confirmed that construction is technically possible, significant erosion, complex land ownership, construction challenges, high costs, and site constraints make delivery on the eastern side currently impractical.

Option A involves taking the path route along the western side of the Colac-Ballarat Road for a distance of approximately 8.8 kilometres, between Meredith Park and the Barwon Water Treatment Plant. As the Colac Ballarat Road is a 100 kilometre per hour speed limit road, this option would involve significant safety measures, including the installation of barrier railing at a safe distance width of 9 metres between the road and path. This would require land acquisition to establish the path to the frontage of the existing properties located on the western side of the Colac-Ballarat Road. The Opinion of Probable Costs for Option A is $8.5 million.

Option B proposes a 6.8 kilometre path along the eastern foreshore of Lake Colac, from Meredith Park to the Barwon Water Treatment Plant. This area has experienced decades of erosion, with Crown land on the eastern side now largely lost. The foreshore varies from gentle beach near Meredith Park, to steep embankments and shallow cliffs toward Flaxmill Road. While this option allows for combined path infrastructure and erosion control – such as revetment walls and boulder beaching south of Irrewarra School Road – it comes with significant challenges. These include complex terrain, high costs (estimated at $26.4 million), and the need for detailed geotechnical, environmental, hydrological, and cultural heritage assessments, along with multiple government approvals before design can proceed.

Option C involved the path being located to the top of the embankment along the lake's edge, between Meredith Park and the Barwon Water Treatment Plan. Due to the significant land acquisition required and construction costs involved, as well as concerns regarding property owner's loss of privacy, this option was not investigated further.

Colac Otway SHIRE

MICHAEL SMITH & ASSOCIATES
LANDSCAPE ARCHITECTURE AND URBAN DESIGN

LAKE COLAC PATH FEASIBILITY STUDY

BEST OPPORTUNITIES

Visualisation of the proposed gravel path extension near Meredith Park Road

The construction of the path is recommended to take place is stages as funding become available. The western side of Lake Colac provides the best opportunity, based on cost and the relative simplicity of the perimeter path's construction. Further detailed planning including consents and referrals covering cultural heritage, ecology and environment would be required.

	Indicative Location	Attributes	Challenges	Opinion of Probable Cost*	Opportunity Assessment
STAGE 1	Stodart Street to Boylans Road	Vehicle access to the path extension via Boylans Road and Stodart Street. Connection to the path and open space network of the nearby future residential areas, including Deans Creek and Colac West.	Further consultation, cultural heritage and ecological investigations are required.	$3,290,840	✓✓✓ (Feasible)
STAGE 2	Boylans Road to the corner bend of Delaneys Road	Vehicle access to the path extension via Boylans Road.	Further consultation, cultural heritage and ecological investigations are required.	$2,500,000	✓✓ (Worth investigating)
STAGE 3	The corner bend of Delaneys Road to Rossmoyne Park	Vehicle access to the path via Delaneys Road at Rossmoyne Park.	To include a boardwalk at the water's edge of one private property where a small section of Crown land is no longer existing. Further consultation, cultural heritage and ecological investigations are required.	$3,500,944	✓ (Requires further consideration)
STAGE 4	Intersection of Delaneys Road and Factory Road to Cororooke	Pedestrian and cyclist connection between Lake Colac and Cororooke, then onto Coragulac.	Drainage investigation and path formation beside the local roads.	(To Be Confirmed)	✓ (Requires further consideration)
STAGE 5	Rossmoyne Park to east of Drakes Lagoon	Vehicle access to the path extension via Langs James Road.	Further consultation, cultural heritage and ecological investigations are required.	$2,903,683	✓ (Requires further consideration)
STAGE 6	East of Drakes Lagoon to Meredith Park Road		Negotiating path route formation through rocky outcrops. Further consultation, cultural heritage and ecological investigations are required.	$8,807,838	✓ (Requires further consideration)
STAGE 7	Meredith Park Road to Flaxmill Road	Fulfillment of the perimeter path loop. Erosion control to the eastern edge and embankment of Lake Colac.	Significant costs, potential land acquisition (Option A), further consultation, cultural heritage, ecological and geotechnical investigations are required.	Option A: $8,517,470 Option B: $25,149,257	✗ (Not feasible, in the short term)
		TOTAL OPINION OF PROBABLE COST INCLUDING OPTION A:		$29,520,775	
		TOTAL OPINION OF PROBABLE COST INCLUDING OPTION B:		$46,152,562	

Colac Otway SHIRE

MICHAEL SMITH & ASSOCIATES LANDSCAPE ARCHITECTURE AND URBAN DESIGN

*Note: Opinion of Probable Costs are inclusive of costs associated with further detailed planning and investigations required, including land acquisition

Colac Otway Shire / P: (03) 5232 9400 / www.colacotway.vic.gov.au

Appendix B1 – Community Responses and Project Team's Actions

F:\D25\217467) - Draft – Lake Colac Perimeter Path Feasibility Study (Revised 23.02.2026)

No.	Summary of Submission	Details of Submission	Consultant Response	In favour/Against	COS Response	Amendment made to Draft
1	I recommend going as far as Ryans lane along the left edge of Drakes lagoon as the current western option shows	As a resident of Cororooke I support a path along the western side of the lake. However, I recommend going as far as Ryans lane along the left edge of Drakes lagoon as the current western option shows. At Ryans Lane I recommend routing the path toward Coragulac, to Corangamite Lake Road and join up (Continued) with the existing walking path going into the township of Cororooke. This route will bring economic benefit to the township. The path would then turn down Rowans Lane to Sheeans Rd onto Delaneys Rd and Sonnet Rd to Boylan's lane rejoining lake path to Colac. Ref My earlier submission.	Consultant reviewed and plotted route nominated by respondent, it would take users away from the lake's edge. The route suggested is probably feasible and will require onsite investigation to confirm available road shoulders' widths and road safety implications.	✓	A trail alignment through to Corooroke was not in the scope of the current feasibility. It would be prudent to include the respondents suggestion in the a summary of feedback to ensure that this is considered moving forward. This supports a staged approach to the perimeter pathway development	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
2	I feel this would be a wonderful addition for tourism in Colac, I would be happy to see if progress in stages maybe first one to Cororooke then Meredith Park	I feel this would be a wonderful addition for tourism in Colac, we already have a beautiful lake lets make it even better. As a local resident I use the lake frequently for walking and coffee its fantastic. I would be happy to see if progress in stages maybe first one to Cororooke then Meredith Park	Response is in accordance to the draft report.	✓	Feedback is consistent with recommendations within the feasibility study. To note in summary of feedback	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
3	I think the need for any path/s around the lake to include a separate bike track could be highlighted.	I think the need for any path/s around the lake to include a separate bike track could be highlighted.	A separate bike track would significantly add to the cost. The proposed trail is 2.5 metres wide as a shared path, cyclists must share with pedestrians/prams/wheelchairs and gofers.	—	Note feedback - Not supported. Noting the length of trail and usage. Shared use can be managed through management and behaviour expectations.	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
4	The proposed increase in the path distance would attract more frequent use from local residents and drae visitors from surrounding towns. While I understand the path extension will be considered in stages, prioritising the Cororooke side would be particularly beneficial.	The proposed increase in the path distance would not only attract more frequent use from local residents but also draw visitors from surrounding towns. This influx could contribute positively to the local economy through tourism and increased patronage of nearby businesses. While I understand the path extension will be considered in stages, prioritising the Cororooke side would be particularly beneficial. This area is experiencing growth due to the new land release estate and increasing residential development along the proposed route.	Agree that the west side should be a priority to the hamlet of Cororooke.	✓	This broad recommendation is in the feasibility study, a specific trail alignment through to Corooroke was not in the scope of the current feasibility. It would be prudent to include the respondents suggestion in the summary of feedback to ensure that this is considered moving forward in future planning.	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
5	While completing the entire lake seems like an incredibly audacious task, realistically I'd be thrilled with a 2-5km extension and better lighting on the stretch west in between the rowing club and lake bowls club.	To whom it may concern, Upon hearing about the feasibility study done on the possible development of a path around Lake Colac, I felt the need to put forward my thoughts on this. As a resident my whole life, I'm an active member of the community especially down on the existing lake path. I've been running for 10 years in the Colac area and love going into the Otways and Forest to run and explore trails. But when this isn't appropriate I quite often run around the lake path at the botanic gardens. I'd run close to 4-5 times a week here and would be overjoyed at the extension of the lake path east or west. The 4km stretch is wonderful as you can't encounter any traffic on these routes. You don't have to worry about crossing roads, cars, reversing out of driveways or changing surfaces from bitumen to concrete to gravel in such short amounts of time. I regularly encounter people being active on the lake path and the recent development of the Colac parkrun is likely to have a positive influence on the number of people that use the path. Adding another section may well improve people's experiences out there on the lake if they wish to walk / run / ride further than 4km without doubling back on themselves. While completing the entire lake seems like an incredibly audacious task, realistically I'd be thrilled with a 2-5km extension and better lighting on the stretch west in between the rowing club and lake bowls club. Thank you for taking the time to read this.	The respondent raises positives about the trail, based on local experience and the extension of the parkrun will attract more participants.	✓	Supports concept of staged implementation. Particularly for local runners and events.	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
6		As a visitor to the area, I support the aim of a shared path that eventually circumnavigates the lake, and links to adjoining footpaths and bike routes. I would visit Colac for the purpose of riding around this path. I wouldn't enjoy riding on the section proposed next to the 100 km/hr road. Start with upgrading current trail and constructing Stage 1 etc, this would then be immediately usable. Decision for east side of lake can always be made later.	Good point linking the existing paths. Not in favour of riding bike next to 100kph road. Validates the proposal to undertake Stage 1 on the west side of the lake.	✓	Support concept of staged implementation. Supports development of the western side in the the staged implementation	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
7		After looking at the plans, to extend the walking path to Deans Creeks Road would be feasible. The cost of going any further are hard to justify when they're are issues of cultural heritage sites or acquisition of private land that both can have ongoing unknown cost For the cost of building the walking track around the lake it is hard to see the benefits even coming close to the cost of building the track. A limited amount of people will walk the whole way round. Most will walk the existing track because a 4-5k walk/run is sufficient for they're exercise needs.	Agree to extending the trail to Dean's Creek. It should be noted that the trail's construction to the west will not involve land acquisition of private land as it will be built on Crown land. The implications of further cultural heritage investigation are unknown at present. A complex CHMP is recommended as a future detailed study. The Dean's Creek is the site for a major residential development with potential contributions by developers for the establishment of open space and connectivity.	✓	Supports the concept of staged implementation.	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).

8		This project could be transformational for Colac — enhancing health, recreation, and liveability while strengthening the town's identity as a true lakeside community. It would attract visitors, support local businesses, and promote more active lifestyles and events. A staged start on the western side could be delivered sooner on existing public land, providing an immediate connection to the town centre and foreshore. This approach delivers early community and tourism benefits while building momentum for future funding and completion of the full circuit. Council could also consider a mixed funding model, combining grants with partial loan funding, to commence works earlier and share costs fairly across future generations. Borrowing a proportion of the cost would strengthen the Shire's case for state and federal contributions and help secure early economic and community returns. A net economic benefit assessment (of each stage?) will be essential to support a compelling business case for external funding. I do not support a roadside alignment for the eastern section of the trail. The project's defining attraction is its lakeside experience, and the route should remain as close to the shoreline as possible. A roadside path would significantly reduce the natural, scenic, and tourism appeal that underpins the Lake Colac concept. If the eastern section remains lake aligned, the inclusion of appropriate erosion controls could improve long-term viability and address concerns of adjoining landholders.	**Respondent raises good points considering community and tourism benefits. A business case and cost benefit analysis needs to be undertaken as a future study.**	✓	**Supports a staged approach on the western side of the lake. Does not support the eastern side development along the road. Supports the need to undertake a business case and cost benefit analysis for each stage.**	Amendments made to Page 4, 7 and 33, planning and detailed design process to include a Cost Benefit Analysis.
9		Feasibility Study demonstrates that a circular path around the lake is neither feasible nor desirable within current economic conditions but provides valuable insights as to where staged priorities lie. Priorities of Council relevant to Lake Colac should be- **Stage 1** **1.** Development of Existing Projects & Access Points • Lake Colac Botanic Gardens Regional Play Space • Meredith park Upgrade • Ongoing maintenance & Improvement of existing foreshore and Path from Clark Street to Stodart Street playground. 2. Clear guidelines and oversight of developments west of Stodart Street Playground and on both sides of Deans Creek to ensure high value environmental values are protected. This includes the billabong in front of the current development. 3. Development of pathway from Stodart Street to Rifle Butts Road on south side of existing mature trees. **Stage 2** **1.** Pathway south along Deans Creek with a bridge close to Princes Highway before proceeding south and veering west to Boylans Road. A boardwalk across the estuary delta should not be considered as this is a unique reed bed area and wildlife refuge frequented by the endangered Australian Bittern, and migratory Latham's Snipe. The existing trees planted by the landholders along the creek must be retained to enhance the walk. 2. Council needs to engage with Eastern Maar with a view to giving suitable recognition bearing in mind that this is adjacent to an aboriginal ceremonial area. A gravel track with minimal soil disturbance is a necessity. Agricultural pursuits and a tree plantation have already changed the landscape and evidence of aboriginal occupation is well known. Surely any artefacts remaining are better left in situ. *For later consideration* **Stage 3** *Boylans Road to Delaneys Road* **1.** Requires negotiation with landholders as there is a large area of low lying crown land. 2. Delaneys Road to Rossmoyne Park. Shire should improve road surface of Delaneys Road suitable for cyclists and improve facilities at Rossmoyne Park. Value and cost of walking track along lake is questionable. **Stage 4** *Not part of feasibility study, but not high cost with Landholder support.* **1.** Extend walking/cycling track along Dairying Company levee bank to Factory Road which would give access to Cororooke and Red Rock. A far more aesthetically pleasing cycle trip and gives a wonderful overview of Drakes Lagoon without disturbing the waterfowl. Why a complete circuit is unwise and not cost effective: **1.** Lake Colac is a tourist's photographic attraction for its westerly views, water birds, pelicans, etc. To ensure diverse species of waterfowl continue to frequent Lake Colac they need an area of seclusion. Rossmoyne Park to Meredith Park is such a place. 2. Eastern shore line is bleak, treeless and high recurring maintenance. I doubt Meredith Park campers would be using it to spend dollars in Colac. Limited use for events. 3. Ballarat Road is not an option. 4. According to the report Parks Victoria would require Shire to take responsibility for all Crown Land cut off by the path. Can they afford the responsibility and cost?	**In favour of short length as part of a staged approach. He supports a considered approach including environmental and cultural investigations before proceeding. In later stages, he acknowledges the need to work with landholders to the improvement of Rossmoyne Park. In support of a connection to Cororooke. Not supportive of the full loop.** **We consider Rossmoyne Park should remain a vey low key visitation area, due to the rock outcrops being habitat for the endangered Corangamite Water Skink.**	–	**Supports a staged and connected link on the Western side. Also supports developments around the lake included regional playground and Meredith Park. Provides another option for connection to Cororooke (not an outcome of this feasibility but worth investigating)**	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
		Stage **1:** I believe the first stage should carry on from Stoddard Street and go west to the new housing estate west of Colac, up to Rifle Butts Road.	**The Consultant Team agrees that this Stage 1 route is feasible and the respondent is correct in advising to link with the large new housing estate planned for the Deen's Creek area.**	✓	**Supported - noted in Appendix B2.**	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
		Stage 2: From Flaxmill Road (treatment works) up to the unmade section of School Road Irrewarra including the opening of that unmade Road. With the pathway being built entirely on crown land.	**The Consultant Team considers the western side of the lake a more achievable and less expensive route to undertake.**	–	**The best prospect for a staged approach is to the western side of the lake on public land and is accessible by car to various points.**	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
		Priority of stage **1**-3 being a comprehensive survey of the land... this would also include a contour height survey of those crown land pathways, to assist further planning of what is required to build the pathway up to the determined minimum height.	**A feature and levels survey for the future planning and design stage, has been factored into the OPC/cost plan within the Feasibility Study.**	✓	**Noted and agree, included in current study. A feature and levels survey is included in the planning and design stage.**	No amendments required.

		SOCIAL: Because the largest proportion of the community could comfortably use this second stage (*"Flaxmill Road to School Road Irrewarra"*), being only 3.5 kilometres long, making it socially acceptable for most people to achieve.	**The hamlet of Cororooke is certainly a draw card and a connection realistically achievable compared to the route to Meredith Park from Flaxmill Road. The residential subdivisions of Rossmoyne Road area and Princess Highway will generate considerable population growth over time and hence demand for open space and recreation pursuits, such as walking and cycling.**	—	**The best prospect for a staged approach is to the western side of the lake on public land and is accessible by car to various points.**	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
		The trail from Flaxmill Road to Meredith Park, would give tourists opportunity to "Award Winning" Irrewarra Sourdough Bakery, via the stage 3 shared pathway. Why did the consultants not mention these options????	**The Consultant Team were not advised of the Bakery and we were prioritising the west side for the reasons mentioned in earlier comments. In the detailed planning and design process, inspection of the bakery will be necessary to factor in the benefits of visitation.**	—	**The west side of the lake is the preferred staged approach and supported by community feedback. If the east was considered in the future, the location and connection to the bakery could be considered.**	Amendments made to page 47, Irrewarra Bakery is noted as a potential destination if the eastern segment is pursued in the future.
		The question must be asked, why did the consultants not take this particularly important environmental factor [erosion] into consideration.	**Water quality in the lake has certainly been a concern for many years as identified in the Macroplan Management Plan (2002), see Appendix C. The Consultant Team did consider the management of erosion combined with the trail location through the proposed construction of a revetment wall (buffer) combined with a walkable platform.**	—	**This comment could be included in the feasibility on the east side.**	Amendments made to page 7, erosion control to the eastern shoreline to be listed as a benefit to the Eastern Shoreline Option.
		We must clean up our Lakes water, so that means we must fix one of the biggest contributors to this failing water quality, being the eastern shoreline erosion. Likewise better-quality lake water will directly benefit Colac and district communities, by preventing less algal blooms, prevent the lake from getting shallower making it more usable for recreation and for longer etc. We also must not forget the permanent loss of some of the most valuable agricultural land in the Colac Otway shire, that gets eroded away every time the Lake gets above a certain height level, never forget once that land is gone, it has gone forever.	**The Lough Calvert channel and spillway has been identified as silted up and affects the outflow of water, therefore artificially raising the water level of the lake. It is important the flow to the Barwon River is maintained and with erosion control measures as per the draft recommendations, which will improve water quality. The comprehensive hydrological study undertaken at the future planning and detailed design stage, will determine levels.**	—	**Noted, water quality is affected by many variables and erosion control would support but would not resolve water quality issues in Lake Colac.**	No amendments required.
		But what I have said to [the landholders] that are not in favour, the chances of receiving stand alone funding to fix your individual erosion, is virtually non-existent, sadly those days are gone.	**The Respondent raises a good point that combined erosion control and trail construction will strengthen the chances of receiving grant funding, rather than relying purely on erosion control. The Consultant Team agree, hence our cross sections show revetment walling and heavy duty pathway that can be driven on by lightweight maintenance vehicles.**	✓	**Agree - noted package up trail development and erosion control may attract funding. Detailed hydrological studies would be required.**	Amendments made to page 7, revetment walling may also support erosion control to the eastern side of the lake.
		WHO ELSE MAYBE AFFECTED BY ANY PATHWAY PROPOSITION AROUND THE ENTIRE LAKE COLAC The first group that springs to mind, are the DUCK SHOOTERS (and I am one) duck shooting is still legal, for how long, who knows. But one thing is for certain duck shooting from the shoreline and a shared pathway anywhere, cannot co-exist, so that is a valid issue to be worked through.	**In the event of duck shooting during hunting season, the west side of the lake gives more opportunity for alternative routes (via local roads) to trail users to avoid duck shooting as opposed to eastern side of the lake. The Consultant Team has undertaken research regrading duck shooting status in Lake Colac which is mentioned in the Study.**	✓	**Duck Shooting is currently legal on the Lake Colac, this would need to be managed. Each year, the Games Management Authority releases the list wetland/lake closures and regulations prior to commencement of hunting season. Refer to Consultant research.**	Amendments made to page **12** (Introduction), through the planning and detailed design process, GMA and DEECA to be consulted on the future of duck hunting on Lake Colac and all management protocols to ensure that the two activities can co-exist.
		FIRE AND SERCURITY AROUND THE ENTIRE LAKE: Yes, fire and security will be compromised (compared to what happens now) for all landholders around Lake Colac, that will be a big issue, and unavoidable if any pathway goes ahead.	**Increasing use of an area provides greater passive surveillance and control. Additionally, regulatory signage concerning behaviour of trail users must be implemented and its effect monitored.**	✓	**Note: to add into the feasibility as a consideration in the detail planning and design process.**	Amendments made to page 6.
		I do note that in a couple of places in the report (see page 23, Agencies 3.2.2 dot point 3) that Parks Victoria recommend that the Colac Otway shire Council be the legally binding land managers for all pathway stages. As a ratepayer of the shire, I am COMPLETELY AGAINST this proposal. Because that would lock the ratepayers of this shire, into all the upkeep and maintenance of the pathway forever and a day into the future, what a costly outcome, so that is simply not on in my opinion.	**While Parks Victoria manage Rossmoyne Park, they have expressly advised they will not take responsibility of the trail's management and associated infrastructure. This was accepted by Council's Project Team at the time of discussions with Parks Victoria in February 2023.**	—	**During the consultation process with Council Officers and Consultant Team, Parks Victoria advised they are not willing to manage the trail and its associated infrastructure. This position can be re-evaluated through the detail planning and design process.**	No amendments required.
		WHY no mention of the LAKE COLAC MANAGEMENT PLAN (by Macroplan) in the entire executive summary, and WHY no mention of this document, in the LITERATURE REVIEW DOCUMENTS TABLE 2.1 This is inexcusable to not have the single most expensive, comprehensive, and dedicated document ever produced, specifically for Lake Colac's entire management, listed or referred to in this study.	**The Consultant will include the 10-page summary of the Lake Colac Management Plan by MacroPlan (2002), prepared in July 2022, in the Appendix, which was accidentally not included in the main body of the draft masterplan. The MacroPlan findings have been used throughout the Feasibility Report and was helpful in the analysis stage.**	✓	**The Consultant's summary will be included in the Feasibility as an Appendix.**	Amendments made, please see Appendix Item C.
		Page 7: RECOMMENDATIONS **1**: Establishment of a reference group . WHY only these statutory authorities, WHY no community membership, there are some truly knowledgeable community members that have valuable specific expertise that should be on this reference group, WHY NOT include them, who knows I may well be one of them (I will leave that for others to decide)	**Yes, the Reference Group should involve interested and informed community members, selected by Council's senior officers.**	✓	**Agree with Consultant comment**	Amendments made; reference to the Lake Colac Advisory Committee as the Project Reference Group (PRG) can be found on page 8 of the Feasibility Report.
10		Page 8: Number 3: Survey of the entire Lake foreshore boundary to locate the exact crown land private land boundaries. I totally agree with this and should be the very first item to be done ASAP, regardless of what stages are eventually prioritised.	**The cost of the feature and levels survey has been allowed for in the OPC/cost plan within the Feasibility Study**	✓	**Agree with Consultant comment**	No amendments required.
		Number 5: Parks Victoria suggesting that council take on the role as the Committee of Management for the entire Lake Colac foreshore. This is a BIG RED FLAG and should be avoided by council at all costs	**Refer to previous comments**	—	**During the consultation process with Council Officers and Consultant Team, Parks Victoria advised they are not willing to manage the trail and its associated infrastructure. This position can be re-evaluated through the detail planning and design process.**	No amendments required.

Number 9: Once again no private landholder representation mentioned here, and should be, as private land is on the lakebed, and is adjacent to the crown land Lake reserve.	**Consideration should be given to private landholder representation in the formation of the Reference Group (as stated in earlier comment)**	✓	**Agree with Consultant comment**	Amendments made; reference to the Lake Colac Advisory Committee as the Project Reference Group (PRG) can be found on page 8 of the Feasibility Report.
Number 12: RIDICICULOUS OPTION and should be deleted immediately. (The option for the Colac to Ballarat Road)	**This is only an alternative option/opportunity which certainly does not embrace the lake's water environment.**	—	**Noted - but not deleted. Its an option and was part of feasibility investigations.**	No amendments required.
Page 12: INTRODUCTION 1.1: It's stated that in 2022, that the Lake was at full capacity. This is a TOTALLY INACCURATE statement, the lakes official full capacity is higher than what it reached in 2022, and therefore will affect any reference at any future planning stage.	**Future hydrological study will be able to confirm levels of the lake, the Consultant Team will advise in the main body that the lake was near full capacity.**	✓	**Amendment required to the introduction to reference "near full capacity".**	Amendments made, refer to page 13. It should be noted that Feasibility Study includes the need for further hydrological study in the detail planning and design process. This is additionally noted in the summary of the community responses to the draft masterplan (Appendix B2).
The AHD level to trigger the outflow of the Lake to lough Calvert IS NOT 117.4 meters as stated (we all would be in very serious flooding trouble if this was indeed the case) The actual answer to this statement is a complex one, taking into account many factors (to detailed to list here) but involves AHD levels referenced as LOWER and UPPER OPERATIONS CURVE LEVELS and your AHD level referenced as 117.4 meters is way higher than the upper operations curve level, and not a height you would ever want to start releasing water to Lough Calvert (disastrous outcome if that was the case) But what this blunder clearly demonstrates, is a clear lack of understanding that the consultants have, of the very important technical data, required to make accurate and precise recommendations, on everything from design, locations, costings etc, this sort of thing is consistent throughout the whole document. So therefore, this is just another reason that I would STRONGLY RECOMMEND, that council and any other statutory authority or interested individual or group, REJECT THIS STUDY DOCUMENT.	**The Consultant Team were advised on 10th February 2023 from Denis Lovric, Manager Water Infrastructure at Corangamite CMA, that the lake spills at 117.4. Denis did advise it depends on operations curve level; the lowest level is 116.6 and the highest is 117.4, as shown on the contour levels indicator plan. When the feature and levels plans are prepared, the civil engineering and hydrological studies will factor in, the working/operational levels.**	—	**Included in feasibility study content, as the Feasibility Study includes the need for further hydrological study in the detail planning and design process.**	No amendments required as Feasibility Study includes the need for further hydrological study in the detail planning and design process. This is additionally noted in the summary of the community responses to the draft masterplan (Appendix B2).
FACTORS and CRITERIA Dot Point 7: This should read "Protection of Aboriginal and OTHER Cultural Heritage"	**Noted, will change in final version**	✓	**Agree to change**	Amendments made to page 22, now reads ""Protection of Aboriginal and other Cultural Heritage"
Now I don't know which of the landholders contacted made that statement [about using December 2022 level for determning trail location], but whoever it had absolutely no idea what they are talking about, and it is not true. If this level were to be used to determine where the trail should go, then (whatever pathway option around the lake) would clearly be destroyed, go under water, or rendered unusable, so this statement must be deleted.	**The Consultant Team do not want the lake levels to be artificially raised. Future hydrological study will be able to confirm levels of the lake, the Consultant Team will advise in the main body that the lake was near full capacity in 2022.**	✓	**As per previous statement a hydrological assessment would be required to establish appropriate levels of the trail to be located. Note that the statement is only a view from local land holder and would be tested.**	Amendments made to page 22, "The statement is only a view from local land holder and would be tested" and it should be noted that Feasibility Study includes the need for further hydrological study in the detail planning and design process. This is additionally noted in the summary of the community responses to the draft masterplan (Appendix B2).
Page 22 Dot Point 3: It is noted that Parks Victoria advised that direct boat access to the lake is not permitted outside of the two formalised boat ramps at Colac and Meredith Park. This is a FACTUALLY INCORRECT STATEMENT and must be challenged. Boats can be launched at the Rossmoyne Park camping ground, at the end of any unmade road that goes into the lake, most importantly boats can legally be launched from any private freehold land, adjoining the Lake Colac crown land reserve.	**Ideally, Rossmoyne Park should only allow for handheld watercrafts to be launched from the existing informal rock arrangement for fear of disturbing the habitat of the endangered Water Skinks. Parks Victoria advised that they don't condone private boats being launched from private properties.**	—	**The current boat ramp at Rossmoyne Parks is not suitable for large boats. In relation to private boat launching - Parks Victoria manage the surrounding land and Rossmoyne Park. It's Parks Victoria's view/preference that boats aren't launched from private properties.**	Amendments made to pages 24-25, it is stated that Parks Victoria has a view/preference for boats not to be launched from private properties.
[Current conditions] also exacerbates the erosion on the eastern shoreline even more, because of the increased water levels. What I have just explained is a crucial factor that must be included , into any pathway location, and design, something that I have not seen mentioned anywhere in this study/report, which is a SERIOUS OMMISSION, and must be highlighted front and centre, when this report is reworked.	**The Consultant Team agrees and is aware of the erosion to the eastern shoreline. Note that erosion conditions has been detailed in other sections of the Feasibility Study report (pages 7, 42 and 61) and in the Lake Colac Management Plan by MacroPlan (2002), see Appendix Item C.**	—	**Erosion issue regarding the eastern shoreline is included in the Feasibility.**	Please see Appendix Item C (Literature Review).
3.2.6 Dot Point 11: Colac Ballarat Road option. In my opinion this would have to be an absolute ridiculous proposal , that serves no meaningful purpose at all, and must be discounted immediately, so as not to waste any further valuable time, effort, and money on.	**This was only raised as an alternative option, but the obvious preference is for the combined erosion control and trail to the lake' eastern edge.**	—	**Noted - but not deleted. Its an option and was part of feasibility investigations.**	No amendments required.
PAGE 31 ASSESSMENT OF ECONOMIC VALUE 3.2.8 As per my previous detailed comments, the benefits of an integrated erosion control barrier, incorporated into the eastern shoreline walking trail, MUST BE HIGHLIGHTED FRONT AND CENTRE in these two sections , because it covers all the values listed, more than anything else in my opinion. And delivers by far the most ECONOMIC VALUE than any other listed option, BY FAR.	**The future planning and design should include a business case and cost benefit analysis within the allocated $750,000 consultancy planning and design fees. The planning and design stage needs to consider tourism, social and wellbeing community connections and trail users' access to short sections of the trail that can be accessed by vehicles, which the western side offers at an achievable cost.**	✓	**Include erosion control for shoreline path as an environmental benefit. Less silting and improved water quality, reduced loss of private land**	Amendments made to page 7, erosion control to the eastern shoreline to be listed as a benefit to the eastern shoreline option.
As for placing the path at the toe of the embankment, so long as it was placed on crown land, and designed correctly, there should be no issues, other than what I have previously stated in my submission .	**Three options were considered a) using the east side of the Colac Ballarat Road (unpleasant aspect: land acquisition and no visual connection to the lake) then b) top of the embankment (not favoured by property owners due to lack of privacy and land management considerations) and c) the trail and associated erosion control measures at the water's edge, which is the preferred option.**	—	**Note the options were discussed as part of the feasibility.**	No amendments required.
Page 71-72 MEREDITH PARK WHY no mention of Lake Colac's ORIGINAL NATURAL OVERFLOW located inside Meredith Park, a particularly important point in the overall scheme of things.	**CCMA will be involved in the future planning and design process.**	✓	**This would be investigated in the hydrological study as part of the future planning and design process.**	No amendments required. This would be investigated in the hydrological study as part of the future planning and design process. This is additionally noted in the summary of the community responses to the draft masterplan (Appendix B2).
Page 73-74 LAKE EDGE SOUTH OF MEREDITH PARK Multiple description inaccuracies on these two pages (to many to list) my advice to the authors (and anyone reading these pages) is you cannot make an accurate assessment of these areas shown in the photos provided (taken from drone footage) I should know because I am a commercial drone pilot, and helped organise that aerial footage, and was present when it was filmed	**We correlated the drone footage to the approximate chainages given in metres. The Consultant Team was careful in calibrating the location of drone footage to aerial photos and inspection of the foreshore at the Irrewarra Road easement and at a property closer to the railway line.**	—	**Detailed feature and levels survey will be required as part of the future detailed planning and design process to correct any inaccuracies of any findings extracted from the drone footage.**	Amendments made to introduction of drone slides in Appendix J.

11		I am a local bird and nature enthusiast, tour operator and Disability Support worker who lives in Colac. I have read the Study and am in favour of the westside trail going ahead, from Stoddard Park to Meredith Park. I have some points I'd like to clarify for my reassurance and future reference. I would also like to speak to my submission at a future Council Meeting. Firstly, as mentioned, I am a bird and nature enthusiast and have spent more than 10 years observing and photographing nature, particularly birds in and around Lake Colac. I have seen and photographed a lot of wildlife in the proposed trail area. Some rare species and a lot are not so rare. A couple of not-so-rare species I am concerned about are the Swamp Wallaby and Eastern Grey Kangaroo populations in the Dean's Creek delta area and on both sides of Dean's Creek. They are not mentioned in the Feasibility Study at all. Will they and their habitat (home) be considered in development? If not, what happens to them? Where do they go? Further information is required. Also, Duck Season is not mentioned in the Study. Will Duck Season continue at Lake Colac if the trail goes ahead? Will the trail be closed to non-shooters during Duck Season, possibly 12 weeks per year, or will it seal the end of Duck Hunting at Lake Colac? The maps for Ecological Issues are unreadable. Pages 91-94, and the list of species, pages 89-90, is more than 5 years old. A couple of the species on the list, the Regent Honeyeater and Superb Parrot, are not relevant to Lake Colac. Will Birdlife Australia, iNaturalist or eBird or any other citizen-science database be used for this study? I would like to share some sightings I believe should be taken into consideration. - Swamp Wallaby population (at least 4) and Eastern Grey Kangaroo population (14 or more), both in the Dean's Creek Delta area and both sides of Dean's Creek, and I have seen the Eastern Grey as far around on the west side as north of Boylans Road. There are also at least a couple more Swamp Wallabies at and north of Rossmoyne Park. - Wood Sandpiper sightings during Summer on the West shoreline at the proposed Rossmoyne Road Lake frontage development. - Corangamite Water Skink sightings at the base of the rifle range mound, approximately 100 metres west of the end of Rifle-Butts Road. - White-bellied Sea-Eagle sighted numerous times in recent years, feeding and roosting on a small tree amongst Basalt rock on the eastern side of Drake's Lagoon near the shoreline of Lake Colac. Approximately Allotment 24-25. - Australasian Bittern sightings in the Dean's Creek Delta amongst the Phragmites. There are a few other endangered and vulnerable species, such as Black Falcon, Plumed Egret, Curlew Sandpiper, and Marsh Sandpiper, that have been positively identified at Lake Colac. Some of the locations of these and other species are indistinct and change with water levels and dry and wet conditions, expanding mudflats, and shifting vegetation. I believe a trail at flood level height, where there are shoreline mudflats, could possibly restrict expanding mudflats stretching outwards from the lake. Mudflats come and go every year and are constantly changing. The optimal water depth for most waders is 0-20 centimetres. Water crashing up against the edge of a gravel pathway will not be suitable, and therefore, a pathway placed too close to the shoreline in these mudflat areas could potentially reduce wader habitat in high water level years. Also, on the East side of the trail plan, if it gets the go-ahead. I wonder if the trail from Meredith Park could follow along beside the lake edge (option b) while the edge is quite flat, going south to the Easement in line with Irrewarra School Road, then follow the easement east to Ballarat-Colac Road and continue from there under option a, parallel along the Ballarat-Colac Road? Making the most of the amount of flat surface available at the lake's edge and reducing the amount of trail by the roadside by 50%. I'm not sure a lot of people will enjoy riding or walking along an 8-kilometre stretch next to the main road. Looking forward to further reviewing processes.	**The respondent raises concerns of biodiversity and habitat values.** **The Consultant Team envisages the trail on the east side beside the lake edge (option B) is preferable than taking users beside the Colac Ballarat Road (Option A).** **Regarding the Ecological Maps 1 and 2, due to the size of the file, the maps were unfortunately compressed and pixelated in the draft version, however we will ensure the final report has clearer versions of these maps. (These maps are attached for your reference)** **Regarding the species list in the local area being five years out of date, our report is 2.5 years old anyway. It should be noted that the future approval process for the trail will include threatened species recorded at the time of the planning permit application and government referrals. The species list enclosed within the draft is not the permission/planning permit application document.** **Note that according to Game Management Authority, duck hunting is currently legal as of the 2025 hunting season. However, the list of wetland and lake closures to hunting is revised each year and will need to be monitored as Lake Colac was closed in 2014.** **The exact height of the trail would need to be assessed to avoid trail flooding.**	✓	**As per consultant's response, high resolution maps to be included in final feasibility study. Note the report includes for ecological assessments through planning and detailed design. It is noted in the report the need for ecological investigation, which would include water level assessment as part of detailed hydrological study.**	Amendments made, unclear maps replaced with higher quality maps (Appendix E).
		The shallow natural fall of land in the region between Boylan's Lane and Delaney's Road means that it is almost inconceivable that landholders would willingly forego the use of large areas of grazing potential between a path and waters' edge by permitting a path on their property (as suggested in the study) thereby necessitating alternative arrangements - compulsory acquisition?	**The Consultant Team is not seeking land acquisition from Stoddard Street Park through to Meredith Park as depicted by our potential path layout plan enclosed within the report (the proposed route is on Crown land).**	–	**Council is not seeking private land acquisition on the western side of the Lake, this is Crown land.**	No amendments required (see page 8).

		Ideally, it would be 3 metres, however 2.5 metres can still be called a shared trail and allows sufficient space for prams, wheelchairs and gofers to pass one another.	—	2.5 metres is sufficient.	No amendments required.
	Accessibility: What is the plan for access for emergency vehicles? Surely first responders can't be expected to park 3-4 km away and still tend to the needy on a timely basis?	Access points are placed on multiple points for Emergency vehicles on Deans Creek Road, Boylans Road, Delaneys Road, Rossmoyne Park and Ryans Lane. The longest gap between access points is approx 5 kms between Langs James Road and Meredith Park.	—	This is a typical access arrangement for longer trails. Emergency vehicles will still be able to access the shared path in an emergency.	No amendments required.
	Public Safety: There appears to be very cursory reference to the issue of snakes but they present a very real deterrent to pedestrian traffic and as a protected species there very few immediate actions other than keen observance, quiet and withdrawing slowly, that path users (adults, children and pets) have to avoid them.	There would be a clear buffer shoulder on either side of the trail and regular warning signage to advise the likelihood of snakes.	✓	Agree with Respondent, needs to be included in Feasibility Study.	Feedback included in the summary of the community responses to the draft masterplan (Appendix B2).
	Safety of livestock: Similarly there's a risk that unfamiliar or impatient pedestrians/cyclists may interrupt the flow of cows returning to grazing paddocks crossing Delaneys Rd at milking times thus requiring chasing/herding. Additionally, this particular option gives rise to an even greater likelihood of bio-security issues to farm holders given the closer proximity of potential path users than the crown land/boardwalk option.	Frequent regulatory signage at access points is important, advising of noise, fire and snakes and respect for cattle and private property fencing.	✓	Include in Feasibility Study as a design requirement/consideration.	Amendments made to page 6, planning and detailed design stage and consultation with property owners will consider issues that pertain to local farms.
	Total Cost: Given the inevitability of cost blowouts in major infrastructure projects, it is not inconceivable the final total cost may be $60 or $70 million or indeed very much more. This is utterly unconscionable given the current climate of cost-of-living crises, the homelessness epidemic and ever-increasing mortgagee sales…	The costs were prepared as accurately as possible by MSA, DPS Engineers and David Harlock of Harlock Consulting (a well experienced Quantity Surveyor).	—	Future planning and detailed design stage will consider a thorough costing assessment/DPC before proceeding.	No amendments required.
	Amenity of Property: At the time of purchase we were not made aware of ANY suggestions of a path or trail anywhere within or near Balmtore. To think that we are now going to have the same issue here with foot and cycle traffic within earshot of our outside dining area and within eyeline of our living areas is devastating.	The Consultant Team suggests formative screen planting at critical locations be established at the approval stage of the trail.	—	Include privacy screen as an option in the design stages.	Amendments made to page 6, privacy screens to be considered in the planning and detailed design stage.
	The option re-directing along Delaneys Rd would not by any means solve all of those but would also be inconsistent with the road's primary purpose of the movement of agricultural vehicles and livestock and there would need to be major upgrading of the road from the intersection with Factory Rd through to Rossmoyne Park, not to mention the works required at Rossmoyne Park itself, which today is nothing more than a swampy clearing.	Road improvements to enable trail on the road shoulders will be part of the planning and detailed design process.	✓	Agree.	No amendments required.
	As we advised the consultants on first contact, we do not support the concept of a perimeter path around Lake Colac and would oppose the construction of a path on our property.	Refer to previous comment about Crown land as the trail/path will not be constructed on the respondent's property, but rather on Crown land.	—	For this land owner, the trail would be built on Crown Land.	No amendments required.
12	The perimeter path in any form is a "nice-to-do" rather than a "need-to-do"	In March 2022, Council's project brief advised that the feasibility study is to be undertaken in response to the aspirations and ambitions expressed by the community and cited by the Lake Colac Foreshore Master Plan.	—		No amendments required.
	There is already significant "pushback" from the community on social media suggesting council should focus on more immediate needs Any landholders who may have supported the concept at first contact with the consultants are likely to have changed stance given the clarification of location and impacts (financial and physical) of a path	From November 2022 to February 2023, the Consultant Team undertook comprehensive and in-depth telephone discussions with most of the property owners surrounding the lake and recorded their responses. The Consultant Team were transparent about the implications of the trail's construction, route, issues and opportunities. Therefore, the Team believes the landowners were sufficiently informed to make a supportive or non-supportive decision.	—	Noted that the trail is not supported by this land holder.	No amendments required. Refer to page 22. In all, thirty-two (32) landowners out of thirty-eight (38) landowners adjoining Lake Colac who do not currently have a path adjoining their property were contacted. Seventeen (17) supported the idea of the perimeter path around Lake Colac. Fourteen (14) were not supportive. One (1) landowner with a small holding was neither supportive, nor non-supportive of the trail.
	Any potential benefits (financial, tourism-draw, community well-being, traffic/user-numbers) are undefined	The future planning and design process will include the preparation of a business case and a cost benefit analysis to encompass tourism and business returns and health and wellbeing benefits.	—	Respondent's comment to be mentioned in the plan. Planning and detailed design process to include a Cost Benefit Analysis.	Amendments made to pages 4,7 and 33, planning and detailed design process to include a Cost Benefit Analysis.

		For the foreseeable future at least, it is unaffordable to continue investigating a perimeter path and should cease any further studies.	**The idea of the feasibility study has been underpinned by strong community support to provide increased recreational opportunities. Other benefits to providing this particular trail include improvement of water quality, reduction of erosion, identifying sensitive habitats and the provision of linkages and nodal points that are accessible to people of all abilities (source: brief and Lake Colac Management Plan by Macroplan, see Appendix C).**	—	**Future planning and detailed design will be a Council decision.**	No amendments required.
13		Dear Council team, I am writing to request clarification on several matters arising from the Lake Colac Perimeter Path Feasibility Study Report (July 2025). Given the scale of the proposed project and the significant public investment required, it is essential that the community has confidence in both the procurement process and the economic justification. **1. Feasibility Study Cost** • Please confirm the total cost of commissioning the feasibility study, including consultant fees and sub-consultant expenses. **2. Consultant Selection Process** • What was the process undertaken to appoint Michel Smith and Associates as the lead consultant? • Was this appointment made through open tender, panel selection, or direct engagement? • What evaluation criteria were applied to determine suitability, particularly given, noting the company profile does not indicate prior projects of comparable scale. **3. Expected Revenues and Returns** • Please provide the projected revenues, economic benefits, and returns against the estimated costs over 5-, 10-, and 15-year timelines. • What assumptions were used regarding visitor numbers, average spend, event activity, accommodation impacts, and ongoing maintenance/renewal costs? • Has a cost–benefit analysis or net present value (NPV) assessment been prepared, and if so, can this be shared? **4. Funding Responsibility** • Who is expected to pay for the project? • Has funding been committed by local, state, or federal government, or is council expected to carry the primary burden? • What proportion of costs are anticipated to be covered by grants, partnerships, or other external contributions? **5. Inflated Costs and Cost Blow-outs** • The cost estimates presented appear inflated • It is also concerning that the feasibility study presents figures under the headings 'Opinion of costs' and 'Opinion of probable costs' despite these being prepared by consultants with extensive experience in the field. Labelling them as mere "opinions" signals a risk of significant cost blow outs compared to the values advised. I note the inclusion of the statement suggesting **"an opportunity for farmers to take on entrepreneurial roles of hosting activities and accommodation."** This wording is derogatory to farmers and misrepresents their role. It needs to be removed from the document. Transparency in procurement, consultant credentials, and economic justification is critical to community confidence. I respectfully request detailed responses to the above points, supported by documentation where available. If the requested information is not provided, or if the details fail to adequately address the concerns outlined above, I cannot support proceeding with the Lake Colac Perimeter Path. In its current form, the investment presents a high level of financial risk and, on that basis, is not justifiable.	**The total cost of the study is $51, 600 ex GST and council paid additional $3,000 for Eastern Maar Representatives to attend a meeting and site investigation.** **Council set the following Evaluation Criteria to which we responded:** - Amount of work set for the budget of $55,000 excluding GST - Capability in understanding the project requirements, challenges and opportunities. - Detailed methodology - Local content **The respondent implies that a business case and cost benefit ratio analysis is required - to this we agree.** **Preliminary information provided in pages 30 - 33 including our team's high level data on tourism and visitation benefits and the health and wellbeing benefits of exercise.**	—	**COSC to provide a response to the procurement process. Funding responsibility implementation at any stage would be of federal grant bodies and return on investment to validated by business case and cost benefit analysis as mentioned in the Executive Summary.** **Council to undertake Quantity Surveying at any stage implemented.**	Amendments made to page 23, the statement "there will be an opportunity for farmers to take on entrepreneurial roles of hosting activities and accommodation" has been removed from report.

14		Comments on Path Plan Page 1 (pg7) - Trail 600mm above high water. 1.2ms - double is needed to allow for wave action. Page 9 - Crown land to Crown by Lough Calvert Trust, I think to State Rivers, I may have details of this action. Page 12 - Full capacity wrong Page 19 - AHD 117.4 trigger outflow of Lake Colac, now higher. Found by GPS by other people and CCMA. To spill now it would take a month at [...] flow to get lake back to right level. Lake had sloping edge Eastside like Meredith Park on lake side of freehold land. Lough Calvert not regulated. Lough Calvert Crown Land runs to near Barpinba-Winchelsea Road off Cressy Road, where 1952 flood went to Lake Murdeduke. Page 32-1 - Impossible to keep Lake at consistent height because drainage time 1st May - 30th September. Longer times have been allowed in flood times, depending on Barwon River. Page 29 - Lake full, should have been going over spillway with South [...]. No because of GPS reading. It must be remembered, real outlet is between old [...] at Meredith Park and New Plantation, across road and into Coads Swamp, east to Gnarwyn Swamp Drain and under Merediths Road at [channel?]. Path needs to [...] to freehold land 1.2m above real height of lake which has to be redetermined. I remain Raymond of Colenso, last living elected commissioner of Lough Calvert Drainage Trust, and member of Lake Colac Beautification Committee.	**The 1.2m height would need to be confirmed through future detailed hydrological study as this height might be subject to location and proximity to the water's edge.** **Unclear as to the terminology ... Corangamite CMA currently has been responsible for Lough Calvert Trust since 1998.** **The Consultant Team will change wording to "near full capacity"** **The Consultant Team were advised by Barwon Water representative of the AHD of 117.4. However, advice from Respondent shows that the Lough Calvert Chanel has silted up causing water level to rise above 117.4** **The Consultant Team is aware that lake level will fluctuate on a seasonal/weather conditions basis, this will need to confirm through the future hydrological study.** **Once the feature and levels survey is prepared, detailed engineering documentation will take into account the spillway level and high water level.** **The path will be on Crown land**	✓	**Note the detailed hydrological investigation would need to occur at the commencement of the detail design process.**	Amendments to be made: Pages 7 and 125: The Consultant Team will change the report to read "600mm to 1200mm height above water, subject to location". Pages 13 and 22: The Consultant Team will change wording to "near full capacity" Pages 20 and 71: 117.4 AHD is what the Consultant Team was advised, however it will need to be confirmed with future detailed hydrological investigation. This investigation/study will be important to confirm height, spillover, levels and more. This is additionally noted in the summary of the community responses to the draft masterplan (Appendix B2).

Appendix B2 – Summary of Community Responses to the Draft Masterplan

Community Support
Community interest in a full perimeter path around Lake Colac has remained strong for many years, including consistent advocacy from the Cororooke community. Residents have repeatedly expressed a desire for improved connectivity, recreation opportunities, and safe access around the lake.

During the 2025 public exhibition period, 14 submissions were received, with 12 supporting the concept in principle. Supportive respondents highlighted:

- Benefits for walking, running, and cycling
- Increased tourism and recreational use
- Strong preference for a staged delivery
- Early focus on extending the existing 4.5km trail from Stodart Street Park to the progress along the western edge of the lake
- Some respondents specifically encouraged Council to prioritise connections to Cororooke, reinforcing the long-term local demand for this project.

Further details on the key themes/concerns stemming from public exhibition are highlighted in sections below.

Strategic Alignment
The proposal aligns strongly with two major strategic documents:

- Colac 2050 Growth Plan
- Lake Colac Foreshore Master Plan (2016)
- Lake Colac Management Plan (2002)

These three documents identify and endorse the long-term vision of a continuous walking and cycling loop around Lake Colac. Delivering the perimeter path would advance long-term settlement planning, improve regional liveability, and support Council's objectives for recreation, active transport, and tourism activation.

Regional Economic, Social and Recreational Value
Lake Colac is a major regional asset that supports recreation, nature-based tourism, cultural heritage community gatherings, and water-based activities.

A completed shared path around the lake would:

- Strengthen community connections between Colac, Cororooke and local communities
- Increase visitor activity and length of stay
- Support health and wellbeing outcomes
- Enable new community and tourism events

Preliminary research undertaken as part of the feasibility study indicates potential economic and wellbeing benefits, though further detailed economic assessment will form part of the next planning stage.

Environmental and Cultural Heritage Constraints
Preliminary investigations identify sensitive ecological areas and cultural heritage values around parts of the lake's edge. While initial findings indicate the project is feasible, more detailed studies are required to:

- Identify extent of cultural heritage sites
- Assess ecological sensitivity and habitat impacts
- Determine areas where trail construction may be restricted

These investigations present a critical project risk. Depending on the significance of identified values, parts of the loop, or potentially the entire project, may be precluded. This will require careful consideration as the project progresses.

Community respondents also emphasised the need to undertake further heritage and ecological assessments. Several reinforced that environmental protection must guide route selection.

Feasibility, Costs and Funding Challenges
The feasibility study completed by Michael Smith and Associates (August 2024) confirms that construction of a full perimeter path is technically achievable.

However, the estimated cost of $47 million presents a major financial challenge for Council.

Key cost-related issues include:

- No secured funding from any level of government
- No current funding strategy for capital or operational phases
- Likely need for a staged delivery model over many years
- Ongoing maintenance and operational requirements for Council

Given the magnitude of costs and significant asset implications, Council may need to limit the immediate scope of works or focus on sections with the highest feasibility and greatest community benefit.

Implementation
The feasibility assessment supports a progressive, staged implementation plan.

The community responses also favour staging, with a clear preference for:

- Early extension from the existing trail between Flaxmill Road and Stodart Street Park

- Focus on the western edge of the lake where greater flexibility exists to divert users if issues such as duck hunting or environmental constraints arise
- Progression toward Boylans Road, Rossmoyne Park and Drakes Lagoon, with eventual connection to Meredith Park

Some respondents also advocated for works on the eastern edge, including integration with structural erosion protection measures, noting this may create stronger grant funding opportunities (combining erosion control infrastructure with the pathway extension).

Advisory Committee Feedback
The Lake Colac Advisory Committee, at its meeting on 8 August 2025, acknowledged:

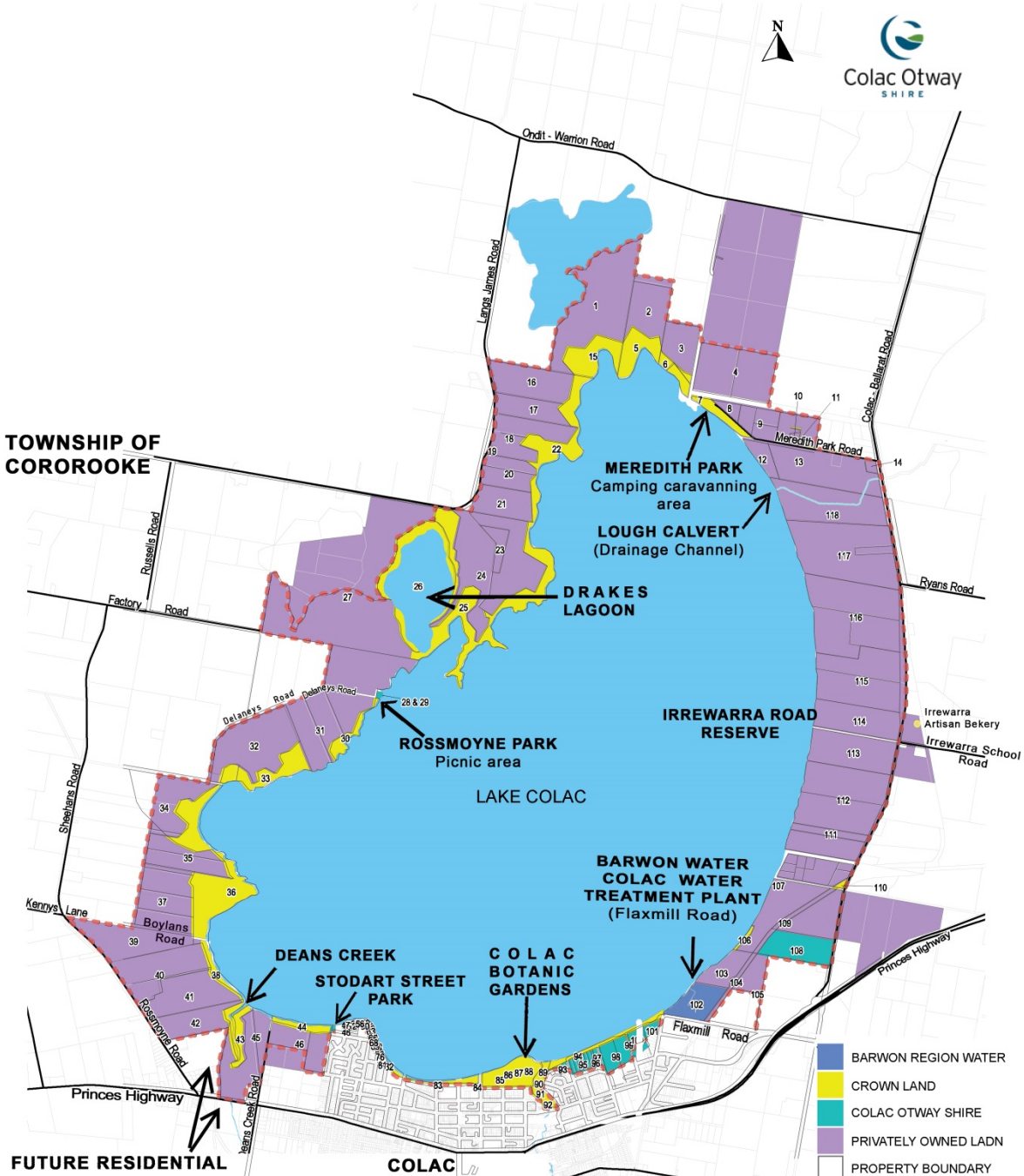
- Enduring community interest in the pathway
- Potential benefits of a complete loop
- Significant delivery challenges due to cost and environmental constraints
- The Committee expressed support for Council pursuing a staged approach, provided:
    - Expectations are carefully managed
    - Decisions do not create unsustainable long-term financial obligations
    - Council remains clear about its role in project management and governance

The Committee's feedback reinforces the importance of a measured, well-sequenced implementation strategy.

Feedback from Public Exhibitions (Summary)
Colac Otway Shire Council issued the draft Lake Colac Perimeter Path Feasibility Study on Council's website from Monday 27th October to Friday 5th December 2025. A summary document including the route layout and options provided an overview of the draft report, both were on display for community review and comment.

Fourteen community responses were received, and each response was thoroughly assessed by Council's Project Manager and the Consultant Team.

The following is the overview of responses received by Council; Appendix B1 presents all submissions received during the public exhibition period, tabled in full. Appendix B1 further sets out the consultant's and Council's responses to this feedback and details the amendments made to the draft feasibility study. These attachments show how community and stakeholder input directly informed the final draft and explain the rationale behind each change.


N
Colac Otway
SHIRE
Ondit - Warrion Road
Langs James Road
Colac - Ballarat Road
Meredith Park Road
TOWNSHIP OF
CORROROOKE
Russells Road
Factory Road
MEREDITH PARK
Camping caravanning
area
LOUGH CALVERT
(Drainage Channel)
DRAKES
LAGOON
Ryans Road
Delaneys Road
ROSSMOYNE PARK
Picnic area
IRREWARRA ROAD
RESERVE
Irrewarra
Artisan Bekery
Irrewarra School
Road
LAKE COLAC
Sheehans Road
Kennys Lane
Boylans
Road
BARWON WATER
COLAC WATER
TREATMENT PLANT
(Flaxmill Road)
DEANS CREEK
STODART STREET
PARK
C O L A C
BOTANIC
GARDENS
Princes Highway
Rossmoyne Road
Flaxmill Road
Princes Highway
Jeans Creek Road
FUTURE RESIDENTIAL
COLAC
BARWON REGION WATER
CROWN LAND
COLAC OTWAY SHIRE
PRIVATELY OWNED LADN
PROPERTY BOUNDARY

During the public exhibition period, Council received fourteen submissions on the Draft Lake Colac Perimeter Path Feasibility Study, with twelve respondents expressing support for the project in principle. Supportive submissions emphasised the significant recreational, tourism and community benefits of creating a continuous shared path around Lake Colac, noting improved opportunities for walking, running and cycling. Many respondents endorsed a staged approach to development, identifying the western side of the lake as the preferred early focus due to its connection potential between Flaxmill Road, Stodart Street Park, Deans Creek, Boylans Road, Rossmoyne Park and Drakes Lagoon, ultimately linking to Meredith Park. Some respondents, particularly those from Cororooke, encouraged Council to prioritise connections that would enhance access for their community. Several highlighted the tourism and health benefits of early extensions, while others called for additional cultural heritage and ecological assessments to ensure that sensitive environmental and cultural values are protected during planning and design.

In addition to cultural and ecological considerations, several respondents highlighted the need for more detailed hydrological investigations before confirming the final path alignment. These investigations will be essential to verify flood levels, assess wave impacts, and determine the extent of existing and future erosion risks around the lake edge. Understanding how fluctuating water levels, storm events, and long-term lake behaviour influence erosion patterns is critical to selecting suitable construction methods and identifying areas where protective measures may be required. Comprehensive hydrological modelling will also help determine whether certain sections of the alignment are viable or whether alternative routes, particularly on the eastern edge, may be necessary due to water movement, lake depth variations, and the influence of the Lough Calvert Channel. These studies represent an important next step to ensure that any future design is resilient, safe and sustainable over the long term.

Feedback on route alignment varied. One respondent strongly supported constructing a combined structural revetment wall and trail along the eastern edge to address issues such as erosion, elevated water levels and the impacts of the Lough Calvert Channel, suggesting this dual-benefit approach could increase eligibility for future grant funding. However, community members also raised concerns about the Colac–Ballarat Road alignment option, questioning safety, duck hunting activity, fire risks, security, and the potential impacts on farming operations. Council's review confirms the roadside route was examined but remains the least preferred option when compared to a waters-edge alignment, particularly given high water levels and limited opportunities to divert trail users around hazards.

Additional work will be required with the Game Management Authority and DEECA to address duck hunting compatibility in future design phases.

Two respondents objected to the proposed western pathway, raising issues including perceived loss of grazing land, limited emergency access, risks to cattle, snake presence, personal privacy, property value impacts, and uncertainty about the trail's economic benefits. Council and the consultant team clarified that the path would be located on Crown land rather than private grazing land, and that the proposed 2.5-metre width meets accessibility standards for shared pedestrian and cycling use. They also noted that snakes are common in wetland environments, and that appropriate signage and public education will manage trail user safety. Further work on economic analysis, including a full business case and cost-benefit assessment is recommended in the next project stage. Additional concerns related to signage, behaviour management, fire control, and interactions between public access and farming operations will be addressed through detailed planning, user education, and regular placement of regulatory and advisory signage.

Appendix C – Literature Review

Document	Information	Implications for trail feasibility study
Colac Otway Shire Community Vision 2050	This document contains the Council' vision statement for the Shire. The contents of the document that have relevance for the trail feasibility study are as follows: Vision statement – we work to preserve what makes our place special. We focus on environmental sustainability to protect our precious natural assets. Themes/actions • Promote sustainable tourism. • Manage infrastructure assets for our community's enjoyment	The feasibility study should take into consideration the Council's goals of promoting sustainable tourism in Colac and implementing the relevant goals of the Shire's Community Vision – that being access to and the enjoyment of key infrastructure assets like Lake Colac.
Colac Otway Shire Council Plan 2021-2025	This document outlines the strategic directions and priorities for the Colac Otway Shire community for the period 2021-2025. The directions in the document that have relevance for the trail feasibility study are as follows: • Attract investment to implement key master plans and projects that will drive economic growth, including Lake Colac Foreshore Masterplan • Maximise our key tourist attractions. • Facilitate development of sustainable visitor infrastructure and accommodation • Protect native vegetation, ecosystems, flora and fauna. • Plan for and supply quality public open space to meet community needs. • Provide fit for purpose, accessible and well-utilised recreation, arts and community facilities and services. • Plan, design and maintain attractive and safe public spaces in partnership with our community and key agencies	The feasibility study should take into consideration the relevant key directions of the Council Plan – these being: • Maximising key tourist attractions • Facilitating development of sustainable visitor infrastructure and accommodation • Protecting native vegetation, ecosystems, flora and fauna • Planning, designing and maintaining attractive and safe public spaces in partnership with our community and key agencies.
Colac 2050 Growth Plan	This document outlines a growth strategy for the Colac. It contains the following references to Lake Colac • Lake Colac is a significant natural feature in the Colac, and is an important environmental, cultural heritage, aesthetic and recreational feature for the community and city. • Lake Colac is a key feature of the town and was an important resource and focal point for Aboriginal people and later European migrants. It remains highly valued by the local Colac community. • Colac has opportunities to leverage residential development and investment to expand its leisure trail networks including the Old Beechy Rail Trail and pathways along its creek lines and Lake Colac Foreshore, connecting nearby hamlets such as Beeac and Cororooke. • The lower reaches of Deans Creek, particularly near Lake Colac, are culturally sensitive and significant sites. • The land to the east of Rossmoyne Road has Lake Colac frontage and is	The feasibility study should consider the attributes, potential, values and opportunity of Lake Colac as described in the Colac 2050 Growth Plan – these being: • Lake Colac is an important environmental, cultural heritage, aesthetic and recreational feature for the community and city. • Lake Colac was an important resource and focal point for Aboriginal people and later European migrants. • Colac has opportunities expand its leisure trail networks including the Old Beechy Rail Trail and pathways along its creek lines and Lake Colac Foreshore, connecting nearby hamlets such as Beeac and Cororooke.

Document	Information	Implications for trail feasibility study
	approximately 83ha. Whilst it is currently remote from the urban areas of Colac, there is an opportunity to connect this area back into town through an extended open space corridor along the lake. This could also form part of a larger connection which continues through to Cororooke, subject to further planning. • The recently developed Lake Colac Foreshore Masterplan also identifies opportunities for enhanced pathways along the foreshore and sections of Barongarook Creek. • In addition to the open space corridor, the 'Botanic Pathway' identified for Colac's waterways, there is also an opportunity to consider the broader open space connections to Cororooke to the west and Beeac to the east utilising an extended Lake Colac foreshore area to deliver an off-road pathway system and open space corridor extension around the Lake Colac. The feasibility and alignment of this should be investigated.	• The lower reaches of Deans Creek, particularly near Lake Colac, are culturally sensitive and significant sites. • The land to the east of Rossmoyne Road has Lake Colac frontage. There is an opportunity to connect this area back into town through an extended open space corridor along the lake. • There is also an opportunity to consider the broader open space connections to Cororooke to the west and Beeac to the east utilising an extended Lake Colac foreshore area to deliver an off-road pathway system and open space corridor extension around the Lake Colac.
Active Transport Strategy 2013-2023	This document includes proposals to enhance the bicycle and footpath network in Colac. With respects to the lake, the Strategy recommends that the lake path be extended to the west to Deans Creek and then south along Deans Creek and a path extending from the lake path south along Barongarook Creek.	The extensions to the path network as described in the Active Transport Strategy 2013-2023 should be considered in the feasibility study, that being the lake path being extended to the west along the foreshore Deans Creek and then south along Deans Creek and a path extend off the lake path south along Barongarook Creek.
Economic Development Strategy 2019-2024	The Strategy outlines how Council will support economic development in Shire. It contains the following reference to Lake Colac: • Investigate existing and future opportunities for economic development associated with public assets (e.g., Lake Colac, Forest Mountain Bike Strategy, COPACC and other Council and State Government assets).	-
Lake Colac Foreshore Masterplan 2016-2026	This document provides a framework to guide the planning and development of the area of the foreshore that extends east-west between Rifle Butts Road and Clark Street; and north-south from the foreshore along the Barongarook Creek Corridor to Murray Street. It also includes Meredith Park on the northern shores of the lake. The relevant sections of the masterplan for the trail feasibility study are as follows. **Vision for the Lake Foreshore** The Foreshore will be: • A place of activity, vitality, tranquillity, and a place to restore the soul. • A place to explore, find new and different things to do. • An expression of beauty, and a place to embrace and nurture the natural world.	The feasibility study for and the design of the trail should consider the vision and key findings of the Lake Foreshore Masterplan, these being: • The lake as a place to explore, embrace and nurture the natural world and have fun. • The AHD level to trigger the outflow of the lake to Lough Calvert is 117.4 metres. The project team traversed all available sections of lake during its highest levels in late 2022. • The discharge channel connecting the Lough

Document	Information	Implications for trail feasibility study
	• A place of celebration, creativity, imagination, and fun. **Lake Hydrology** • Water flows into the lake from its tributaries, Deans and Barongarook creeks. Rainfall and domestic run off also make up a high proportion of the total annual inflow. Lake Colac has been characterised as being in a partially closed system with surface outflow restricted to particularly wet seasons. It also has low catchment relief and fluctuating water levels. • Prior to the installation of the Lough Calvert Drainage Scheme, in periods of heavy rainfall Lake Colac would overflow to adjacent properties and into a Lough Calvert System. The construction of the Lough Calvert Drainage Scheme in 1953 aimed to prevent flooding of rural properties. The Scheme is managed by the Corangamite Catchment Management Authority. • In 1958 the discharge channel connecting the Lough Calvert basin to the Birregurra Creek was extended to Lake Colac to allow seasonal releases of water from the lake to the Barwon River to limit the occurrence of future flooding. • The AHD level to trigger the outflow of the lake to Lough Calvert is 117.4 metres (to be confirmed in the future hydrological study as part of the planning and design process). **Shore erosion** • Lakeshore erosion is a natural process in Lake Colac. It particularly occurs on the eastern bank of Lake Colac due south-westerly, westerly and north-westerly winds, which generate wave action to the surface water of the lake and wash against the bank of the eastern side causing significant erosion. • There are currently three identifiable causes of the lakeshore erosion - the controlled levels of water in the lake and enhanced inflows from development, trampling and grazing of stock in the catchment and de-vegetation. • Maintaining a constant water level through the Lough Calvert Drainage system would also affect the natural erosion process by restricting natural fluctuations. • The erosion to the eastern edge of the lake combined with no Crown land available, unlike the western edge, make the construction of the trail quite problematic on the eastern side of the lake. **Flora and Fauna** • Lake Colac has significant habitat areas. The natural habitat for the Corangamite Water Skink is found in three known sites of the lake's shore - near Meredith Park, on the properties known as "The Points" and Rossmoyne Park. The Skink is listed as Critically Endangered in the Flora and Fauna Guarantee Act. • A bird sanctuary area was constructed at the eastern end of The Esplanade. It is linked by the existing 2.5-metre-wide gravel trail that connects the car park east of	Calvert basin to the Birregurra Creek was extended to Lake Colac to allow seasonal releases of water from the lake to the Barwon River to limit the occurrence of future flooding. • Lakeshore erosion is a natural process in Lake Colac. It particularly occurs on the eastern bank of Lake Colac due south-westerly, westerly and north-westerly winds. • The erosion to the eastern edge of the lake combined with no Crown land available, unlike the western edge, make the construction of the trail quite problematic on the eastern side of the lake. • A path could help address erosion but would require significant investment and likely a partnership between multiple levels of government. Investigating the feasibility and providing costing estimates of erosion control measures was outside the scope of this feasibility study. • Lake Colac has significant habitat areas. The natural habitat for the Corangamite Water Skink is found in three known sites of the lake's shore - near Meredith Park, on the properties known as "The Points" (west side) and Rossmoyne Park. • A bird sanctuary area was constructed at the eastern end of The Esplanade. It is linked by the existing 2.5-metre-wide gravel trail that connects the car park east of the caravan park to the Barwon Water Colac Treatment Plant • The sealed sections of the foreshore pathway are frequently used. While not as extensively used, the unsealed track from the wetlands to Clark Street is popular,

Document	Information	Implications for trail feasibility study
	the caravan park to the Barwon Water Colac Treatment Plant **Use of lake foreshore areas** • During dry periods low water levels means recreation activities are largely restricted to land-based activities associated with walking and cycling trails, the Botanic Gardens, and nature observation, and picnicking. Feedback and observation show that the sealed sections of the foreshore pathway are frequently used. While not as extensively used, the unsealed track from the wetlands to Clark Street is popular, especially for dog walkers. Residents use the foreshore for a variety of activities with trail related activities the most popular. • The proximity of the lake foreshore to the well-established residential areas of the town, the caravan park and the botanic gardens allows residents and visitors to easily access the lake. Lake Colac provides a special experience of accessibility to a large water body and open space, not often found in rural towns. • The existing pathway to the foreshore edge is four kilometres in length. The existing path system is a combination of concrete, granitic sand/gravel. The development of additional paths preferably connecting to the existing path should be explored. There is potential to link the western side past Boylans Road to Rossmoyne Park, then further north the path could edge around Drakes Lagoon or alternatively by road to the township of Cororooke that is located on Factory Road. The available Crown land to the northern edge of the lake would connect the trail from the Drakes Lagoon area to Meredith Park. There is potential to locate a path system to the eroded eastern edge of the lake as a dual erosion control measure and pathway system.	especially for dog walkers. Residents use the foreshore for a variety of activities with trail related activities the most popular. • The development of additional paths preferably connecting to the existing path should be explored. There is potential to link the western side past Boylans Road to Rossmoyne Park, then further north the path could edge around Drakes Lagoon or alternatively by road to the township of Cororooke that is located on Factory Road. The available Crown land to the northern edge of the lake would connect the trail from the Drakes Lagoon area to Meredith Park. There is potential to locate a path system to the eroded eastern edge of the lake as a dual erosion control measure and pathway system. • Interpretive signage along the path outside of the caravan park, then midway to the bird sanctuary. There is some existing interpretive signage on the environmental values at the existing car park to the west of the bird sanctuary.
Lake Colac Foreshore Masterplan 2016-2026, excerpt from the masterplan about existing and future paths	**Description** <u>Zone 1: Rifle Butts Road to Stodart Street West</u> • There is no formal pathway and there are limited opportunities to construct a pathway that would be above the pre drought high water mark. There is evidence (desire lines) of minor bicycle and or foot traffic at the Stodart Street entrance to the zone. • There is merit in considering options for extending shared pathways to the west of Rifle Butts Road through this zone as part of a long-term strategy to extend a pathway east and west around the perimeter of the lake. There is an indication of minor bicycle, motorbike, and or foot traffic to the west of Rifle Butt Road. The foreshore from this point to Deans Creek is attractive and serene and encouraging of walking, mountain bike riding, and nature observation activities. <u>Zone 2: Stodart Street West to Stodart Street East</u> • Between Stodart Street West and Stodart Street East there is a concrete pathway	The feasibility study for and the design of the trail should consider the comments made in Lake Colac Foreshore Masterplan about the existing path attributes and condition of the existing path and its potential for expansion, these being: There is merit in considering options for extending shared pathways to the west of Rifle Butts Road through this zone as part of a long-term strategy to extend a pathway east and west around the perimeter of the lake.

Document	Information	Implications for trail feasibility study
	that runs along the narrow strip of foreshore between the boundaries of adjoining residential properties and the lake's edge. Stodart Street West, Balnagowan Avenue and Stodart Street East provide the only access down to the foreshore in this zone. • There is an opportunity to create a more significant 'end of trail' destination at this point and to increase local use with the addition of more family friendly features such as seating, shade, natural/landscape play elements. Access to the site is via local streets, which will restrict opportunities to make this a more significant point of access to the foreshore other than for local residents. • The ramped access pathway from Balnagowan Avenue is rough as a result of periodic attempts to stabilise and level it, and as a result does not comply with access codes of practice. There is an opportunity to enhance the appeal of this zone for walkers and bike rider with the addition of shade trees; however, feedback indicates that the desire of adjoining property owners to maintain water views to the lake, may conflict with this objective. The ramped access pathway from Balnagowan Avenue has recently been concreted to enable easier access although full DDA compliance for gradient has not been achieved. <u>Zone 3: Stodart Street East to Armstrong Street</u> • The concrete foreshore pathway continues through the Colac Yacht Club and Colac Sea Scouts precinct. There is significant potential for this area to be an attractive access point to the lake pathway, lake views, and the water body if water levels increase. • Access to the precinct is via a residential road, which will restrict the level and type of activity that could be encouraged in the precinct. <u>Zone 4: Armstrong Street to Gellibrand Street</u> • The two-metre concrete foreshore pathway is on a narrow strip of foreshore that is bounded by the old lake bluestone retaining wall and the steep embankment that rises to meet Queens Avenue to the south. • Queens Avenue runs parallel with the foreshore pathway and provides excellent views over the lake. It is popular with walkers and bike riders and is a popular lunch spot for visitors and locals. <u>Zone 5: The Foreshore/Commons</u> • In this zone the pathway hugs the side of the Rowing Club building and continues along the top of the blue stone wall until the edge of the grassed 'common' area where it becomes a brick paved pathway. A second pathway runs along the base of the Colac Botanic Gardens property title boundary. The first precinct is the formal component of the Botanic Gardens. • The foreshore zone is the main recreation and activity area within the study area.	Council has built a concrete footpath along Queen's Avenue from the Lake Bowling Club to the gardens. It is well a well utilised and valued asset.

Document	Information	Implications for trail feasibility study
	When water levels were higher, this was a busy and often overcrowded precinct with car parking extending along Fyans Street. This was the main entry point for motorised boating and associated activities such as skiing. • The foreshore pathway diverges at the main car park. To the left it continues along the foreshore, crossing the boat ramp and then travels to the north of the caravan park and on to the Barongarook Creek crossing. To the right it continues around the rear of the angling club's pavilion to the playground. <u>Zone 6: The Esplanade and Wetlands to Bruce Street</u> • The main pathway continues its way along the foreshore to the north of the open grassland area abutting The Esplanade. This area is within the designated flood zone, is low lying, and slow to drain after rain events. After past very high-water levels, and particularly when accompanied by northerly winds, this area has flooded. • The pathway continues along the foreshore where it connects to the dirt/gravel maintenance track. The wetland and bird sanctuary provides habitat for over 20 species of water birds, including a number of migratory species that are listed under agreements between Australia, Japan and China for the protection of migratory birds and their habitats that are in danger of extinction. • A raised boardwalk connects the end of the Esplanade to Fyans Street and Quamby Street. The boardwalk traverses the low-lying Barongarook Creek lands, with the west arm crossing the creek via an old timber bridge to meet up with Fyans Street. The east arm of the boardwalk links to Quamby Street. The boardwalk is narrow with right angle junctions that do not provide easy access for bike riders. While there is limited interpretive signage at the termination of Church Street at the small carpark area, the entire foreshore corridor of approximately 500 metres from the botanic gardens and boat ramp east along the caravan park to Church Street requires interpretive and wayfinding signage to several locations to enhance the user experience. <u>Zone 7: Bruce Street to Clark Street</u> • The pathway in the form of the maintenance track continues along the foreshore past the former landfill site and the informal extension of McGonigal Street to Clark Street. The Master Plan does not recommend the site for BMX or other related activities that were raised for consideration during the project. Consideration could be given to allowing dogs off-leash given it is not a significant habitat or recreation zone and there are no other opportunities to allow dogs off-leash in the parklands. <u>Zone 8: Lower Barongarook Creek to Chapel Street Bridge</u> • From Fyans Street the pathway travels along both sides of the Barongarook Creek	Wayfinding and interpretive signage needs to be provided at Fyans Street and Quamby Street. The existing narrow boardwalk should be replaced with a wider boardwalk with handrails. This has now been upgraded to a 2.5 metre concrete shared pathway from the caravan park

Document	Information	Implications for trail feasibility study
	and crosses the creek 4 times. The pathway has been upgraded to a 2.5-metre-wide concrete shared pathway from the caravan park to Murray Street and is now in good condition. <u>Zone 9: Upper Barongarook Creek from Chapel Street to Murray Street Bridge</u> • The Barongarook Creek pathway continues under the Chapel Street bridge to emerge on the western side of the creek as a 'desire line,' an unformed track that continues through the 3rd/4th Colac scouts precinct to rejoin the sealed pathway. The path on the east side has been upgraded to a 2.5-metre-wide concrete shared path. The main pathway through this zone is accessed from the footpath on Chapel Street and travels along the east side of the Barongarook Creek. • There is however the opportunity to continue the public artwork trail proposed for zones 6 and 8 upstream and through this zone. This zone can be enhanced with plantings to screen adjoining properties, including the motel. When the pathway meets with the Murray Street wayside stop, the main branch of the pathway follows the creek line past the scout precinct and passes under Murray Street. • The other branch of the pathway travels along the eastern side of the wayside stop where it ends at Murray Street. Council has carried out considerable work in this area to increase its profile as an entry point to the parklands and creek pathway. The Corangamite CMA has also carried out rock beaching in this section to stabilise several bends in the creek. **Conclusion and recommendations** • The style and condition of pathways throughout the parklands differs significantly. The most common surface is concrete as in the vicinity of Murray Street and Ross's Point and bitumen. In the area between Quamby Street and the Esplanade there is a raised walkway. The construction of the brick pathway in the Foreshore Zone is a relatively recent development. For some residents, the pathway will be very symbolic and there is likely to be a sentimental attachment. When the pathway is upgraded consideration must be given to an appropriate incorporation of the pavers into the pathway or an appropriate feature. This should be done in conjunction with people for whom the pavers have special meaning. • Overall, the narrow width (1.8-2.0 metres) of pathways and the uneven or poor condition of surfaces means pathways are well below the recommended minimum of 2.5-3.0 metres width. Pathways throughout the parklands are used by families with prams and children on bikes or scooters; skateboarders and inline skaters; fitness and recreation joggers and cyclists; and dog walkers. • The master plan recommends that when pathways are upgraded to meet the standards for shared pathways in recognition of the range of activities, ages, and skill levels they cater for. The master plan also recommends that pathways have a	to Murray Street, which is in good condition. An unformed track still exists on the west side of the creek. The east side has been upgraded to a 2.5 metre concrete shared path.

Document	Information	Implications for trail feasibility study
	0.5-1.0 metre clearance either side, be of a consistent width, and have a smooth and even surface. This should also apply to access pathways and ramps from adjoining streets and carparks. • A relatively immediate opportunity to achieve this is via the Murray Street underpass trail that currently ends in the vicinity of the railway line. There is an opportunity to upgrade the trail in line with guidelines recommended in the master plan and to extend it to connect with nearby residential areas via the existing pathway or roadway network. These works will need to be accompanied by relevant pathway and road markings and signage. • If and when subdivision occurs in the vicinity of Rifle Butts Road (zone 1) the Master Plan recommends that an exclusive bike lane be constructed along the Moore Street extension to service the secondary college and the new subdivisions, through to Deans Creek. This should be a minimum width of 1.5 metres within the 60km/hr driving zone.	
2003 Lake Colac Socio-Economic Assessment Profile D17/78878	This document contains the findings of an assessment into the socio-economic benefits of redeveloping Lake Colac. The key findings were as follows: • Through a staged redevelopment Lake Colac will be a major cultural, tourism and economic asset for Colac and the Colac region. • Lake Colac provides the centrepiece for increasing the number, length of stay and yield of visitors to Colac and to the Great Ocean Road hinterland. • The Lake redevelopment will make Colac a more attractive place for investment and living and will deliver substantial benefits to local residents through enhanced leisure, recreation, entertainment and cultural experiences.	The feasibility study should consider the findings of the Lake Colac Socio-Economic Assessment Profile which indicate that the enhancement of the Lake Foreshore will have significant socio-economic benefits.

Lake Colac Management Plan July 2002 – Prepared by MacroPlan Australia & COSC

Detailed Summary & Analysis

2.0 Vision 2015

The natural environment of Lake Colac will be an inspirational place for the local economy and visitors to enjoy.

2.2 Key Objectives

Biodiversity and Natural Environment

- Improve water quality
- Reduce catchment erosion and sediment station as well as Lakeshore erosion
- Manage the natural environment and habitat diversity for existing fauna (both indigenous and non-indigenous)
- Address the impact of fluctuation in water levels
- Broaden the management of waste (litter)
- Manage the contents of stormwater both as it enters the lake and at the source
- Reduce the levels of discharge/leachate

Economic and Tourism Development

- Increase the visitation by local community
- Increase the visitation by non-local community (day/overnight)
- Encourage expenditure/jobs created by increased visitation
- Increase levels of visitor satisfaction

Cultural, Social and Recreational Development

- Making activity nodes and the linkages, including signage, to activity nodes accessible and inclusive to community members of all abilities
- Acknowledging and celebrating Lake Colac's heritage both indigenous and post European
- Providing cultural opportunities to recognize and celebrate Lake Colac and its community's identity
- New developments to incorporate consideration of mobility issues, circulation and linkages hence ensuring accessibility for all levels of ability, wherever possible

3.0 Introduction

MacroPlan Australia, in association with Earthtec was commissioned by the Colac Otway Shire to undertake the Lake Colac Management Plan in 2001. The purpose of the plan was to provide ongoing framework for the community, local and state agencies to manage and promote ecologically sustainable development and land use practices for the Study Area.

This management plan differs from other management plans as it identifies the need for a new management structure while also specifying a new project outcome. Because of this, the report focuses on environmental rejuvenation for the future role and development of Lake Colac. However, given that there is substantial cost associated with this direction, it became apparent that substantial effort was required to identify economically feasible ways of addressing the current environment issues and achieving a sustainable environmental outcome. A triple bottom line assessment prioritises projects and programs as a basis for developing the integrated development concept for the lake.

3.1 Report Framework

The Lake Colac Management Plan is the culmination of the development of a Discussion paper and an Issues and Opportunities Paper which involved a period of extensive background research.

3.2 Study Area

Lake Colac is situated to the north of the township of Colac, 151 kilometres south-west of Melbourne, among the basalt plains of Victoria. The brief identified that lake Colac and its environs are under pressure due to historic, economic, land use and lifestyle decisions made by landowners, government agencies, businesses, residents and households.

Recent descriptions have painted a subdued picture of the lake, citing degraded shoreline habitats, polluted waters and a township that has in some ways turned its back on the lake. The recreational and leisure capacity of the lake is currently underutilised, particularly in comparison with historical levels. There is also significant untapped tourism and commercial opportunities connected with what should be viewed as the 'Jewel of Colac', Lake Colac.

4.0 Environmental Management

4.1.2 Shape and Geology

Lake Colac is relatively shallow and has a water surface area of 2,668ha. The maximum depth of the lake is 2.4m. The catchment area of the lake is 217km^2. Most of the catchment is made up of volcanic materials whilst tertiary sand and mudstones make up the remainder. The volcanic rock and soil have low permeability, creating higher runoff than the tertiary sand and mudstone sediments.

4.1.3 Hydrology

Lake Colac us a relatively freshwater lake however it is still considered "brackish". Water flows into the lake from its tributaries, Deans and Barongarook Creeks. Rainfall and domestic run off also make up a high proportion of the total annual inflow. Lake Colac has been characterised as being in a partially closed system with surface outflow restricted to particularly wet seasons. It also has low catchment relief and fluctuating water levels.

Lake Colac has no regular drainage or natural surface outlet to the ocean. In most years, rainfall is balanced by evaporation or seepage. After prolonged and heavy rainfall events, natural processes involve water from lake Colac spilling over into the nearby depression of Lough Calvert. Lake Colac overflows from its northern end into the Lower Lough Calvert when its water rises above EL 117.6m. Lough Calvert only receives water from rainfall in its small catchment area or from Lake Colac overflows. In its natural hydrologic regime, Lough Calvert experiences dry perios. In recent years the Lough Calvert Drainage Scheme has controlled the flow of water from lake Colac to Lough Calvert and the Barwon River.

4.1.4 Background – Lough Calvert Drainage Scheme

The Lough Calvert Drainage Scheme was initially constructed in 1953 to affect the drainage of flood waters in the land locked Lough Calvert basin that had collected following a series of wet years and the overtopping of the banks of Lake Colac. In 1958 the discharge channel connecting the Lough Calvert basin to the Birregurra Creek was extended to Lake Colac to allow seasonal releases of water from the lake to the Barwon River in an arrangement intended to limit the occurrence of future flooding.

There is a need to regularly review the operation and management of the scheme to ensure it remains operating in a best practice regime with respect to current social, economic, and environmental circumstances. The system has operated since that time under guidelines that have received minor modifications over that time to reflect community views and environmental improvements. The scheme is operated by the Corangamite Catchment Management Authority.

4.1.5 Settlement History of the Lake Colac Region

There is evidence that Aboriginal tribes occupied the Corangamite basin. In the 1850's gold rush, Ballarat's population increased and extended to the Corangamite region. European settlement continued and since the 1900's, large areas of land in the region have been privately owned and cleared. The population extended from the lake's edge as the settlement occurred in a period of low rainfall, the alluvial and windblown floodplain soils made productive agriculture and grazing areas, particularly for sheep and cattle. Floodplains and wetlands were drained to increase the area of arable land.

4.2 Current Environmental issues in the Lake Colac Catchment

4.2.1 Water Quality – Nutrients

In February 1982, the State Environment Protection Policy (SEPP) No. W-34A was published. It states "Water quality problems were recognised in Lake Colac at least as early as 1935. In the 1970s these problems were seen to warrant detailed investigations. After the summer of 1972-73, there was "public concern expressed over the occurrence of noxious blooms of blue-green algae" in Lake Colac causing the "deaths if numerous livestock and several fish kills". In January 1993, there was an outbreak of Anabaena, a freshwater algae and Aphanizomenon, a blue-green algae. These algae are toxic and required warning signs to be put in place. In March 1994 a similar outbreak meant that drinking and skin contact were banned., there properties that are not fenced off from the Lake risk exposure of their cattle to the blooms.

There is a long history of industrial effluent flows into lake Colac from which the lake has not recovered. Some pollutants (including heavy metals) are embedded in the sediments of Lake Colac. A study was carried out in 1978 on the sediments of three eutrophic lakes in Victoria, including Lake Colac. The lake's sediments were found to contain the highest levels of all forms of phosphorus, and also possessed by far the greatest potential for the release of dissolved reactive phosphorus to the overlying water. It has been suggested that the cause of high phosphorus levels in the lake are "probably a reflection of the higher external phosphorus loading rates" for the lake.

4.2.2 Current Water Quality Issues – Nutrients

Perceptions of the "health" of Lake Colac appear to be poor. Contributing factors include the water quality, the high pollutant content in sediments of the lakebed, the impact of agricultural activities and Barwon Water discharges from the Colac sewage treatment plant. The population serviced by the sewage treatment plant is estimated at 12,500 people and 4.7 MI/day of sewage is treated. In addition to domestic waste, significant trade waste discharges from Regal cream, CRF (meat processing facility) and the Colac Sale Yards (17.5%-24% of the total load) are also processed.

Barwon Water is upgrading the Colac Sewage Treatment Plant to improve the level of treatment and bring effluent quality into line with *Guidelines for Managing Sewage Discharges to Inland Waters*. The discharge is currently categorised as Class C treated effluent in line with 'Guidelines for Waste Water Reuse'. The upgrade will ensure a higher level of treatment, to Class B treated effluent quality, prior to discharge into the lake. There is likely to be a significant improvement in the quality of water entering the lake as a result of these works.

During the consultation process in December 2001, it was suggested that "independent testing should be introduced" to ensure that the quality of water from the Sewage Treatment Plant complies with its EPA licenses. Barwon Water advises that all water, sewage, effluent and treated effluent quality monitoring is now conducted independently by Water EcoScience under contract to the authority. The Colac Otway Shire is

developing a Stormwater Water Management Plan for their urban areas including Colac that is aimed at protecting the beneficial uses of the lake as the receiving environment of the stormwater discharges from Colac and Elliminyt. This plan is important because urban stormwater runoff poses a threat to the water quality of the lake. The stormwater management plan for Lake Colac will include:

- Preservation methods to preserve existing valuable elements of the stormwater system such as natural channels, wetlands and stream and lakeside vegetation
- Source control to limit changes to the quantity and quality of stormwater at or near the source
- Structural control such as gross pollutant traps, detention basins and treatment techniques to improve water quality and control stream and drain flow discharges to the lake or creeks.

Implications for the Environmental Objectives of the Lake Colac Management Plan

High Nutrient levels and run off into the lake from its catchment are likely to have a direct effect on the lake and many of its users. Management of the nutrient levels in the lake is an important factor of the Management Plan as high levels may affect environmental, recreational and utilitarian uses of the lake.

4.2.3 Rising Sewer Main

Barwon Water advises they have introduced an assessment scheme for their assets based on condition and criticality. This is identified the rising main along the lake for sure as a priority for works, principally due to its inaccessibility. Barwon Water is prepared to assist in the implementation of recommendations in this plan associated with access paths and trails along this section of foreshore on the basis that they can be developed to provide the necessary maintenance function required by the authority. The authority has also implemented works on it's Colac Pumping Station No 1 near the confluence of Birregurra Creek and the lake foreshore to improve its security against failure and accidental discharge.

4.2.4 Water Quality – Salinity

The lake has no natural constant outlet for water, so it generally leaves the system by evaporation or seepage. In natural conditions, reduction in salt load only occurred when the lake overflows. This situation has resulted in thousands of years of salt accumulation. The salinity of water in the lake is highly reactive to the lake level. The salinity of the water in Lake Colac is higher than acceptable for drinking water, but still able to be used for irrigation. It is approximately 10 times less saline than seawater. There are two major sources of salt into the lake. The first is the lakes sediments which originate from volcanic materials including bar salts that are high in salt content the second source is from both Deans and Barongarook Creeks.

Implications for the Environmental Objectives of the Lake Colac Management Plan

Salinity levels, which vary from the natural regime of Lake Colac, are likely to be detrimental to native flora and fauna species of Lake Colac. Where indigenous plants are not able to survive a different regime of salinity levels they will be replaced by more tolerant species, which may be exotic. The diversity of native plants and animals is likely to decrease with changes to the natural regime.

4.2.5 Catchment Erosion and Sedimentation

Sediment enters Lake Colac through natural catchment processes. However, an increased amount of sediment is evident due to clearing of native vegetation in the catchment and foreshore zone to allow agricultural land use. Catchment erosion processes cause sediment to be transported across the land surface and via the tributaries. Introduction of agricultural land practices in the early 1900s affected natural processes in the lake Colac catchment. This activity resulted in extensive gully and sheet erosion throughout the catchment, causing sediments to be transported into the waterways and Lake Colac.

The increase in lake sediments is causing a decrease in the depth of the already shallow lake and affecting the range of activities that can take place. The Lough Calvert Drainage Scheme spillway is 117.4m AHD. Landholders report that there has been 0.2m of sediment build-up in the spillway.

Implications for the Environmental Objectives of the Lake Colac Management Plan

The increasing settlement levels in the lake may potentially affect the turbidity of its water. This is likely to alter the natural habitat of native fish and macroinvertebrate communities. Sedimentation in the lake will also affect the chances of aquatic vegetation surviving.

4.2.6 Lake Shore Erosion

Lakeshore erosion is a natural process in Lake Colac. It particularly occurs on the eastern bank of Lake Colac due to the dominant south-westerly winds, which generate waves and corresponding erosion. The Corangamite Catchment Management Authority has proposed works along the eastern foreshore to control the erosion. There are currently three identifiable causes of lakeshore erosion:

- The controlled levels of water in the lake and enhanced inflows from development
- Trampling and grazing of stock in the catchment
- Devegetation

Anthropogenic activities such as allowing stock access to the lake foreshore have increased rates of lakeshore erosion, particularly on the eastern banks. The erosion problem is also affected by the natural soil type and soil structure in the catchment.

Maintain a constant water level through the Lough Calvert Drainage system would also affect the natural erosion process by restricting natural fluctuations.

Implications for the Environmental Objectives of the Lake Colac Management Plan

Erosion of the Lake Colac shores is a process to which the native flora and fauna have adapted. Removal of native vegetation which originally held the banks together, fluctuating water levels, grazing and trampling by stock and drought are all likely to have increased the rate of erosion and affected the natural communities. Increased rates of bank erosion have had detrimental effects on the habitat for native fauna.

4.2.9 Flora and Fauna

Issues with Flora

The pre-European vegetation community in the Lake Colac region is categorised as grassy woodland, plains grassy woodland and swamp scrub with small areas of other vegetation communities. North from Colac, the natural vegetation was in the general category of tussocky or tufted grasses and graminoids. South from the lake, the natural vegetation was categorised as medium (10-30m) Eucalyptus trees, with 30-70% cover of the highest stratum and greater than 30% low shrubs.

Issues with Fauna

The overall ecological condition of the Corangamite Basin is poor. However, several of the lakes, including Lake Colac have significant habitat areas. An example of a significant habitat area is the natural habitat for the Corangamite Water Skink, which is found in three known sites of the lakes shore. The natural habitat is found near Meredith Park on the northeast west shore of the lake where the skink has been found. They are on the properties known as “The Points” and Rossmoyne Park. The Corangamite Water Skink is listed as Critically Endangered in the Flora and Fauna Guarantee Act.

A bird sanctuary area was constructed at the eastern end of The Esplanade, close to the township of Colac. Some bird hides have been destroyed, possibly by high water levels, which have also affected the vegetation in the reserve. The main difficulty of this industry is the loss of sustainable feeding zones and safe boating depth over a significant portion of the lake and appropriate launch and recovery facilities given the current situation.

Issues with Water Levels

Lake Colac is a land locked system, which occupies an abandoned depression of the once more extensive Lake Corangamite System. The natural lake process involved water overflowing its eastern bank into the Lough Calvert system when levels were high. There are 6.5 kilometres if eroded foreshore between Meredith Park and the limestone cliffs close to the Colac Township. Water levels are managed by the Corangamite Catchment Authority by way of releases from the lake under strict operation rules:

- No releases between November and April
- No releases if the salinity in Barwon is greater than $1,700_{EC}$ in May, June, October and greater than $2,500_{EC}$ in July, August, September
- No releases if the lake is below a target level which varies with the time of the year. The lake target level is aimed at achieving a sufficient volume for flood mitigation. Had the drainage system not been constructed, Lake Colac would have flooded 13 times since 1952
- The Lough Calvert system operates by releasing water from Lake Colac all the lows, in accordance with the above operating rules, through regulators into a channel that directs the water to the Barwon River

Implications for the Environmental Objectives of the Lake Colac Management Plan

This change in the natural regime has affected the native flora and fauna. Species that originally existed in the flood path areas, such as most of the low Calvert, and now denied water, which is held in the lake. The constant water level would have an effect on many indigenous flora and fauna species. While the low Calvert system regulates water levels it also affects flora and fauna. It also contributes to settlement and salinity levels in the Barwon River. Prior to the systems installation, the flow of sheet water travelled north through a number of basins. It now flows south, directly into the Barwon River.

4.2.10 Litter

Concern has been expressed about the dumping of hard waste on agricultural land adjacent to Lake Colac, causing an eye sore. An existing litter trap at Armstrong Street limits the volume of litter entering Lake Colac from the Township. However, the trap may not be operating at full effectiveness due to lack of regular cleaning. Litter entering Lake Colac may potentially have a detrimental effect on the native fauna, fish and macroinvertebrate species in and around the lake. It is important to note that while recent improvements have been identified including Barwon water upgrade in the quality of treatment and effluent quality from C class to B class and the development of the stormwater management plan, the issues identified above impinge on the environmental sustainability of Lake Colac.

4.3 Land Use

Physical Link with Town

There is a lack of physical and perceptual links between the Central Activities Area and Lake Colac. Although visitors gain glimpses of the lake as they enter Colac, there are no linkages or activity nodes to draw them the way from Murray Street/Princes Highway to the lake.

Foreshore Cohesiveness

Development, activities and landscaping along the urban foreshore lack focus and cohesiveness and appear ad hoc. Individual sporting and community groups undertake their own projects with limited or no consultation or

coordination with management bodies. Access and inclusion is also an issue with respect to the general access between activity areas such as the Botanical gardens, the town centre and landmarks around the lake.

Foreshore Use for Water Based Activity

The lake supports recreational activities that rely on the foreshore in order to utilise the waterway, these activities include boating, recreational fishing and commercial fishing.

Land Use Along Foreshore

Industrial activities on the eastern end and western edges of the lake detract from the scenic landscape values and general amenity of the lake. This is due to land use zoning around the lake, including industrial zones at the periphery of the town, reflecting historical land use patterns and attitudes to the lake. Foreshore activities along the urban edge of the lake foreshore are predominantly recreational in nature. Several community groups utilise facilities on the foreshore and have contributed to improvements and the establishment of facilities over time. However, the foreshore lacks physical linkages and a sense of coherence.

The residential market is strongly influenced by the lake. Attractive, well-established residential areas exist along the urban edge of the lake, with several properties having gardens that extend to the foreshore. Newer residential areas have been established along the ridge at Elliminyt to take advantage of lake views. Views from the eastern and western edges of the lake towards the residential areas of Colac are attractive and present a positive image of the town. Meredith Park, on the northern section of the lake, is currently used as a 'free' informal camping spot, which is particularly popular with fishing people. As this area attracts a high level of use, maintenance issues have arisen in terms of keeping the area rubbish free.

4.4 Cultural, Social and Recreational Issues

4.4.2 Trends in Health and Wellbeing of the Community

A greater association by the community regarding the benefits of leisure to health and wellbeing. Therefore, more activities undertaken by the community could be likely to have a fitness component due to increasing awareness regarding issues of public health and a direct link to lifestyle and leisure.

4.4.4 General Trends in Community Life

A greater emphasis on access and equity for all spheres of the community. A reduced perception of "community" and a greater importance on the value of the family unit in terms of social and recreational interaction. Therefore, there is the need for safe activities and activity based around mealtimes as well as for fitness reasons. The propensity of older members of the community to spend significant periods of time alone – the management of the lake will need to accommodate a safe environment for older people and an environment where many people can interact, thereby increasing social interaction.

4.4.5 Participation in Leisure

Greater demand for recreational activity that is active, yet informal and greater demand for activities/experiences that offer the participant safety and security. Access to leisure facilities for all people regardless of age, gender, physical or intellectual ability. This is evident through changes in legislation and building practices. The need for information and different levels of communication regarding access to better information about leisure and recreation in and around the lake. This could be through a need for signage, promotion of activities and facilities at the lake.

4.4.6 Issues for Leisure Facilities and People's Expectations Regarding Quality

Improved facilities, safety and increased accessibility for all groups in the community, will enable and encourage local members of the community and tourists to travel further to access a resource such as Lake Colac and its foreshore. Greater demand for facilities with associated amenities. Sport and outdoor related recreation is emerging as a basis for tourism and is provides an appropriate synergy at Lake Colac. Better access to appropriate flora and fauna including water birds.

4.5.4 Foreshore Use

The area between the Botanical Gardens and the lake is a major focal point on the foreshore. There is currently a lack of interpretation of local heritage and history around the foreshore. In particular, significant aboriginal sites should be considered. Opportunities exist for an information trail to educate the public about their cultural associations with the area. Acknowledgement of disability access and inclusion for all cultural and recreational developments should be maintained. The foreshore should be developed further to attract pedestrian and bicycle transport. A walking track would be a significant addition to the foreshore, particularly increasing accessibility to the currently utilised areas between Ross' Point and the Botanic Gardens. It would also allow a linkage and could be combined for a bicycle track to link as the Lake Colac Trail, in connection with the Beechy Line concept.

4.6 Cultural Heritage

The local Aboriginal communities are Framlingham Trust and Wathaurong Aboriginal Co-operative. These families are the local custodians relevant to the study area. Local knowledge and history associated with their interpretation of the area would be a valuable contribution to community education and local understanding of the study area. Stakeholder consultation indicated that some areas around the lakes foreshore are considered sacred and stories of the local aboriginal culture are known.

5.0 GAP Analysis

The opportunities assessment has been compiled based on gaps identified as part of the research undertaken for the project. These gaps relate to infrastructure provision and the management and use of the lake, as identified from the research. The analysis is generated through an assessment of the following subject areas:

- Environmental
- Land Use
- Social and Cultural
- Economic

Some of the opportunities considered to date are:

- Environmental
    - Establishment of Wetlands
    - Improve Water Quality
    - Community Education and Research
    - Erosion Management
- Walking Track
- Tourist Drive
- Festivals/Events and Programs
- Foreshore Development
- Signage Program
- Improvement of Accessibility around the Foreshore
- Tourism Development

5.1.5 Social, Recreational and Cultural

Objectives	Strengths	Opportunity	Barriers	Viability
To promote Lake Colac as a tranquil setting	• Natural environment • Relative lack of competition for this type of product • Proximity to Melbourne and Great Ocean Road • Fast growing market segment • Potential local demand • Popular across a number of age cohorts	• To develop facilities that tap into the lakeside health and wellbeing concept • To package the experience with eco-tourism etc	• Cost of development • Availability of appropriate land • Possible soft interest from developers	Low/medium

Major concepts to be explored:

- Walking tracks around the lake and Barongarook Creek
- Bird watching facilities

6.0 Opportunity Identification

6.1.1 Environmental Management

- Deliver a sustainable management framework to oversee the development of the lake, foreshore and catchment
- Improve water quality – erosion control, discharge and input management
- Maintain the lake and its foreshore as a habitat for indigenous and non-indigenous flora and fauna
- Community education regarding the lake's operation

6.1.2 Planning Infrastructure Development

- New gateway to the lake that provides a 'sense of arrival' for visitor and the local community
- A walkway that integrates both passive and active recreation and links the major assets and attractions on the foreshore with the Colac township
- Development of the public access areas on the foreshore

6.2.4 Opportunities for Managing Lakeshore Erosion

An integrated approach is needed to determine and manage the causes of erosion that need to be addressed. They include the removal of natural vegetation cover, relatively constant water levels and stock access.

- Rockwork: lakeshore erosion could be controlled by rockwork, particularly along the eastern foreshore. Landholders raised concern that a pathway would promote access to the lake by the public.
- Structural Solutions: Groynes have been constructed close to the Botanic Gardens to control lakeshore erosion. Groynes have also been constructed at Meredith Park and have allowed sand deposition to occur on both pales resulting in protection to the adjacent foreshore embankments.
- Log Reef: Another option is to create a log reef close to the shore of the lake and encourage natural aquatic vegetation such as the common reed to establish.
- Education Programs: landholders need to be aware that their agricultural practices in the catchment affect the lake.

6.2.5 Flora and Fauna

Flora

Protection and restoration of native vegetation is being carried out at several locations around the lake. Revegetation includes grasses, rushes and a range of other riparian species. A 100-200m buffer zone has been suggested to reduce grazing pressure and protect native species. Such a buffer would affect access to the foreshore and require land to be acquired by the Crown. A buffer already exists on the western, northern and southern sides of the lake. Another suggestion is the construction of elevated boardwalks to protect the native flora and allow recreational activities to continue.

Fauna

Consideration should be made to protect the habitat of the Corangamite Water Skink. Suggestions of potential management actions include fencing and recreational management at Meredith Park, fencing, revegetation and predator control and "The Points" and fencing, revegetation, recreation management, predator control and possibly weed control at Rossmoyne Park.

6.3.2 Land Use Opportunities

Lake Colac has the capacity to emerge as a destination in its own right. Several previous studies have highlighted the desirability of creating improved linkages with the Central Activities Area. This would be a crucial part of an overall strategy aimed at enhancing perceptions about the lake and promoting an image of Colac that encompassed the lake as a key asset. A tourist road would enable the ability to establish strong physical linkages between the lake, Murray Street and the Princes Highway. These may include attractive boulevards. The provision of new linkages to the lake will only be effective if the lake itself is regarded as a destination. This can be achieved through general enhancement works and the creation of interesting activity nodes that prompt visitors to stop and enjoy the lake.

Open space – path – linkages between the Botanical Gardens and a path development with opportunity to extend from Ross' Point to Bruce Street. Ensure that access and inclusion underpin any development of access paths and linkages, in all public access areas including Ross' Point, Meredith Park and the Barongarook Creek.

6.3.3 Social Indicators

Design of new facilities and areas of public open space will need to address:

- Current and future levels of accessibility enjoyed by the majority of the population.
- "Quiet and peacefulness" is important to locals and needs to be balanced against visitor needs and those in the community interested in more active use.
- The current and future age distribution.

6.3.4 Social and Cultural

- Interpretive walk – history/heritage/public art.
- Promotion of the lake through cultural and sporting activity.
- Bicycle path linkages between Lake Colac, the Old Beechy Line and the Great Ocean Road. Incorporation of Barongarook Creek in pedestrian linkages between the foreshore and town centre.
- Disability access and inclusion for all members of the community. Provision of seating for rest points, provision of ramps for wheelchair access r easier pedestrian access.
- The provision of facilities such as the proposed bike path, walking track, barbeques, sightseeing areas all enable a low cost use of the foreshore.

7.0 Implementation

7.1.9 Erosion

An identified source of sediment to the lake, the eastern shore lunettes can be readily remediated to reduce erosion. Particular distress occurs to the eastern foreshore lunette embankments at periods of high lake levels and while there is documented evidence, consultation supports this and referred to “many metres of prime freehold land being lost” during these times.

7.1.11 Water Environment

Adjacent landowners have historically fenced into the lake as water levels have dropped to contain their stock. With water levels now being generally maintained at more constant levels, the existence of posts at and below water level is an issue to lake users. Their removal will require the reinstallation of fencing parallel to the shoreline to contain stock. In many instances these parallel fences if constructed on title boundaries, will be within the water body. This situation occurs for about 6km along the eastern shoreline, other sections of shoreline having boundaries above the usual water levels.

7.1.15 Improve Connectivity/Integration

Several previous studies have highlighted the desirability of creating improved linkages with the Central Activities Area. This is a crucial part of an overall strategy aimed at enhancing perceptions about the lake and promoting an image of Colac that encompasses the lake as a key asset.

7.1.17 Signage Program

Prepare a hierarchical suite of identification, direction and interpretation signs to be implemented progressively in conjunction with the masterplan. The signage theme should be established at the upper end of the hierarchy. Distinctive use of colours, imagery, materials, a logo, or sign structure may be used to define the overall theme.

7.1.20 The Colac Common

The ‘Common’ precinct has been identified as the main foreshore public access area and is recommended to include the major recreational, cultural and economic development facilities along the foreshore adjacent to the township. It is envisaged that the common will be the main activity area on the foreshore and linked to the proposed tourist road with the Colac Town Centre.

7.1.23 Wetland Walk

Interpretive walk to be developed though the wetlands to the south of the lake and adjacent to the Colac Common area, utilising the former tip site and the main inking parcel of land for the eastern section of the walk. Some of the details include:

- Re-establishment of indigenous flora
- Development of Tourist Road
- Extended pathway to Delaney’s Point
- Establish interpretive walk in line with existing pathway
- Eastern shore erosion control measures
- Link to Meredith Park

8.0 Organisation and Management

8.1.1 Introduction

This chapter proposes three (3) management models to address issues outlined in Chapter 4. Particular emphasis on the need for a new management entity capable of clarifying responsibilities, streamlining

operations, sharing lake status information, prioritizing development, balancing diverse interests, and coordinating funding efforts. **Option 3** is the preferred management model.

8.2 Development of Management Options

Detailed assessment of organisation and management frameworks and responsibilities was undertaken to determine initiatives and shared values for Lake Colac in order to suggest an appropriate management agency.

8.2.1 Option One – Maintain Correct Structure

Nine separate management bodies will continue overseeing different aspects of Lake Colac. Parks Victoria will retain responsibility for Delaneyy's Point and Meredith Park, while Colac Otway Shire will maintain jurisdiction over the foreshore areas. However, this management structure lacks clear priorities and a unified focus, resulting in overlapping responsibilities and limited strategic direction.

8.2.2 Option Two – Committee of Management (DNRE)

A new committee would be established, bringing together representatives from the various management bodies responsible for the Lake Colac catchment. The committee would be overseen by the Department of Natural Resources and Environment (DNRE). However, given that the priorities of the catchment and those outlined in the Lake Colac Management Plan are not fully aligned, there is a risk that differing agendas could lead to inaction or a lack of sustained interest in the management of the Lake Colac catchment.

8.2.3 Option Three – Committee of Management (Colac Otway Shire)

A new committee would be established, administered by Colac Otway Shire (COS), comprising representatives from the current management bodies responsible for Lake Colac. This permanent committee would work closely with the community, COS, and relevant government agencies to implement the Lake Colac Management Plan and seek funding opportunities, with a COS councillor serving as the community representative. The committee would be responsible for overseeing capital works and ongoing operational expenditure, with funding potentially supported through a special or differential rate. It would also prepare an annual business plan and key performance indicators and be accountable to COS for management costs and the delivery of strategic actions.

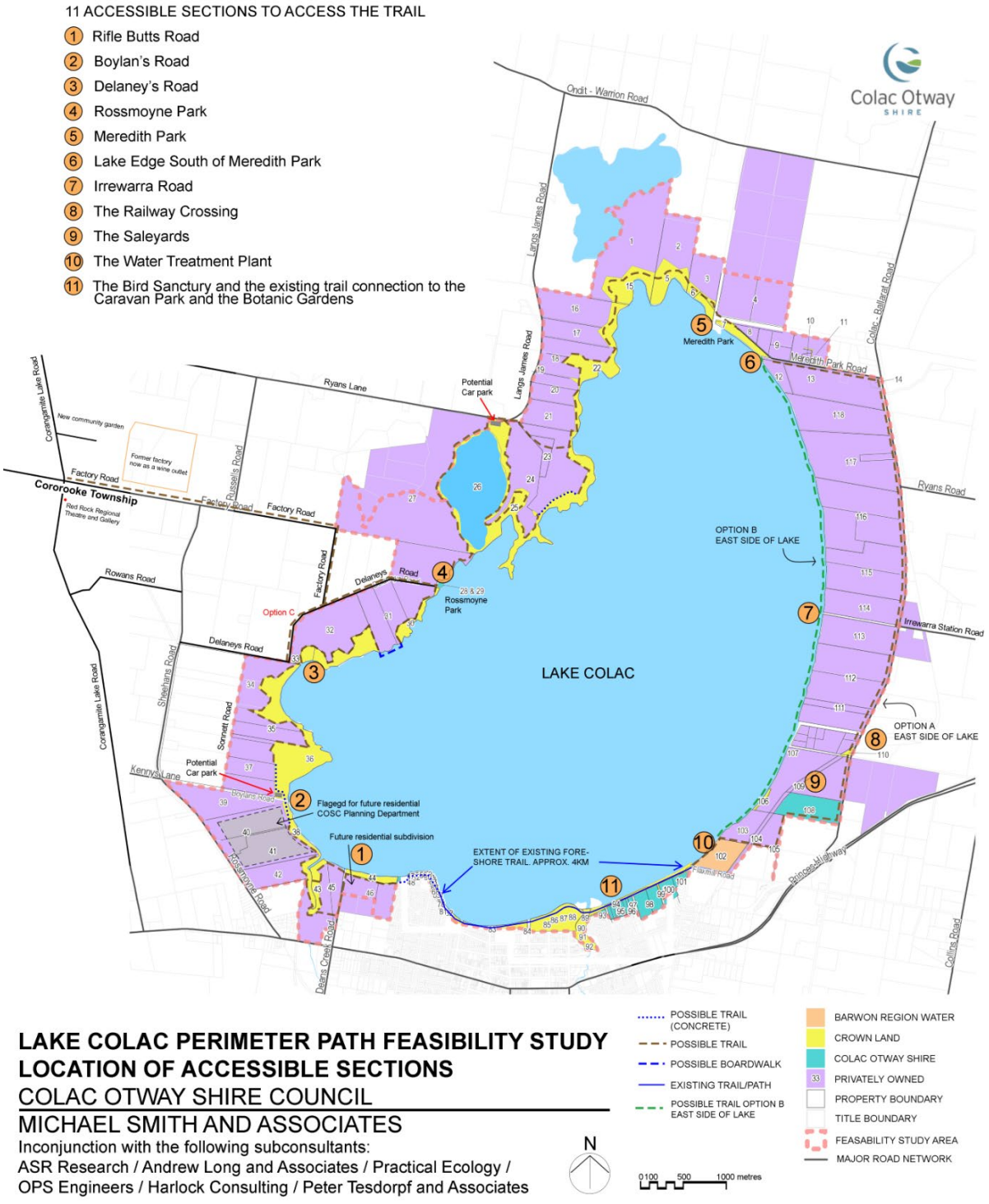
8.3 Preferred Option

Option Three is the preferred approach for the development and operation of Lake Colac as it establishes, for the first time, a dedicated and ongoing focus on the lake's management. This single-purpose structure is considered necessary to ensure the effective implementation of the Lake Colac Management Plan and to reduce reliance on capital raised through special or differential rates and matched funding from Commonwealth, State, and private sources over time.

Option Three enables a flexible management framework operating across both project development and operational levels. It would support the identification, coordination, and delivery of infrastructure consistent with the Management Plan, including the preparation of a detailed business plan, identification of funding opportunities, prioritisation of maintenance and infrastructure works, and facilitation of public and private sector partnerships. In addition, the model would oversee operational management by establishing budgets and business plans, maintaining essential infrastructure, developing long-term funding strategies with relevant agencies, and reporting to Colac Otway Shire on progress and implementation stages.

Appendix D – Location of Accessible Sections

The following is the review of the analysis of accessible sections of Lake Colac commencing at Deans Creek and working clockwise from Rifle Butts Road. There has been substantial urban forest planting of native trees within the parcel of land east of Rifle Butts Road. The forested area will provide a wonderful eastern edge to the future subdivision.



1. RIFLE BUTTS ROAD (No.1 on the map above)

The future perimeter path or trail will need to integrate with planned pedestrian and cyclist connections within the proposed residential subdivisions.



There is a large subdivision planned for both sides of the Princes Highway close to Deans Creek and Rifle Butts Road. The Rifle Club uses land in this area for its activities under a private agreement with the landowner. The club has been notified by the landowner that in the near future, the land they occupy will be subdivided and sold as residential land. As a result, the Rifle Club is looking for alternative accommodation. The future perimeter path or trail will need to integrate with planned pedestrian and cyclist connections within the proposed residential subdivisions. There may be opportunities to achieve this section of path in collaboration with property developers.

The consultant team inspected the mounding for the Rifle Club's target zone and observed the presence of lead shot in the outfall area. The consultant team was informed that there is lead shot in the lake. Site decontamination will be a requirement of future subdivision activity. While the Rifle Club still operates in the area, there are a range of safety considerations that would have to be made regarding a walking/cycling path in the immediate vicinity, however because the club is flagged to move in the longer term, possible trail routes will be mapped on the assumption that the Rifle Club will not be in the area.

Deans Creek rises in the land to the south of the Princes Highway and currently flows by a somewhat curvilinear route into Lake Colac as a wide delta formation. Wet and soggy ground prevented the consultant team from entering the delta from the eastern approach. It appears by an aerial photo that the delta is approximately 130 metres wide.



A narrow tract of native trees, including some indigenous trees line Deans Creek and these should be retained wherever possible in the new subdivision layout. The new subdivisions to either side of Princes Highway may direct stormwater into Deans Creek. This will significantly add to the creek's capacity and may necessitate widening as a channel to cater for increased capacity of stormwater. There is a substantial number of registered Aboriginal artifact sites on the Heritage Victoria (H.V.) Register. These will dictate how the

infrastructure is planned within the Deans Creek Precinct. Council has prepared a precinct plan. The crossing of Deans Creek should be set back from the delta outflow to minimise the extent or length of boardwalk (cost implications). Setting a boardwalk away from the delta will create greater opportunities to link and connect with the subdivision's planned path network.

2. BOYLANS ROAD ACCESS TO THE LAKE (No.2 on the map)

Access along the earthen and relatively flat Boylans Road revealed that there is very little fall into the lake from the current water's edge (lined mainly with Phragmites). Approximate distance of up to 60-80 metres west of the water's edge, there is 200mm – 300mm fall into the current water level, which is probably reasonably high with the wet winter of 2022. This may necessitate consideration of a boardwalk section. During the team's visit, Lincoln Kern the Ecologist from Practical Ecology made an observation that the soil type in this area is a distinctive black volcanic mud (similar to Merri Creek clay used for cricket wickets). This was later backed up by Lincoln Kern's review of geology maps.

From Boylans Road around the west side of the lake to Meredith Park, private land that was to the edge of the foreshore was purchased by the then Department of Natural Resources (now equivalent DEECA). It is unclear if it was an optional buy-back scheme, or a compulsory acquisition and the exact year(s) is unclear. The consultant team received different records from several landowners, however the late 1970s/early 1980s is likely to have been the time. The reason for the government intervention was so land management on the west side could be better controlled with respect to the impacts of grazing and sensitivity of the environment and Aboriginal sites.

3. DELANEYS ROAD (No.3 on the map above)

Next point of observation was Delaneys Road, approximately one kilometre west of the Sheehan's Road. There is a high point overlooking the lake's foreshore with scattered but reasonably extensive occurrences of rock outcrops within farmland that may very likely be Crown land. An inspection of one of the properties in this zone that possibly has two marker posts defining Crown land (according to the owner) indicated that most of the rock outcrops in this particular property are within private property. Until a boundary re-establishment survey is undertaken in a future stage, the exact Crown land boundary is unknown. The feasibility study

includes pricing for re-surveying. The trail could be on grade as the land rises from the water's edge at this area.

4. ROSSMOYNE PARK (No.4 on the map above)

The next area is Rossmoyne Park, accessed via Delaneys Road.

Rossmoyne Park is a Parks Victoria site that offers a small area of approximately 30 x 30 metres for camping above the water level. It may be possible to launch a small trailer drawn boat on the "pseudo" basalt rock ramping that abuts the water's edges.

The key feature for Rossmoyne Park is the basalt rock outcrops that are likely to be the habitat zones for the threatened Corangamite Water Skink. This species inhabits the fracture lines and joints between basalt rocks.

Exploration south of the Rossmoyne Park car park area indicated an on-grade trail could be established between the low basalt rock outcrops and a farm fence line approximately 60 to 80 metres from the current water's edge. A point to resolve with the trail's location and proximity to farm properties, is the current issue of Foot and Mouth Disease found recently in Indonesia. This may have implications in some farmers' minds of people spreading the disease on their footwear on a trail close to their fence lines. Dispersal of the disease is through soil and soil affected by general soggy indicated ground and stormwater movements. Further review of this will need to be made with the C.C.M.A. and the Department of Agriculture, DEECA and A.W.E in Canberra.

Approximately 300-400 metres north of the Rossmoyne Park camping ground the land beside the existing fence line is very low lying and the preliminary assessment revealed that a significant length of approximately 200 metres would need to be in boardwalk to avoid soggy water-logged ground, the other option is building up a soil formation to lay gravel on grade and punch drainage lines every 20 to 30 metres to facilitate drainage water from the farm property to drain down to the lake without the earthen formation trapping and creating a dam against the formation. Approximately 500 metres north of the Rossmoyne Park car park, there is the entrance to a very small "secondary lake" that appears as an attached satellite to the main lake.



The mouth of the small lake to the northwest appears as 30-100 metres across and a board walk would possibly be necessary and based on the field assessment and desk top research from Vaia Liousas of Andrew Long and Associates, indicates this area has a substantial number of H.V. Registered Aboriginal sites. The trail should turn northwest from this point to follow the higher ground inland to skirt around the small lake (subject to drone and further desk top mapping review by MSA, Practical Ecology and OPS Engineers. Subject also to land ownership and any lease agreement.)



An area near Ondit, Holcim Quarry has offset planting. Members of the consultant team met with the Quarry Manager while the consultant team was viewing the quarry from the western edge and access road into the quarry.

5. MEREDITH PARK (No.5 on the map above)

Next area of investigation is Meredith Park. A designated camping ground on the lake's sandy 'beach' foreshore. Meredith Park is a recognized home for the endangered Corangamite Water Skink. The camping ground has a four WC toilet facility, an old concrete picnic setting and one small picnic shelter and table. There are two interpretive signs about the critically endangered Corangamite Water Skink that inhabits the scattered basalt rock outcrops. The fissures of cracking are quite special as the basalt rocks have split with a grid of narrow openings or cracks.



The presence of basalt rocks with fissure lines and small open cracks and general basalt rock outcrops provides ideal habitat for the skinks. Meredith Park has an earthen access road in the reserve itself.

The camping and picnic area extends for an approximate 150-200 metres length and some 40 metres wide which includes a beach-like section and grassed area for camping and car parking. A modern toilet facility is centrally located.


Further northwest beyond the pine trees, it is evident farm fences span into the lake, roughly at right angles to the foreshore. The consultant team walked approximately 300 to 400 metres around the high-water line on dry ground to investigate general ground locations. There is a fence line running parallel to the water's edge approximately 50 to 100 metres from the current edge. The ground surface is in the order of one (1) to one and a half metres above the current water level. This would allow an on-ground gravel path to run as a curvilinear path layout between low in ground rock outcrops.

There is still a 3-4-kilometre perimeter length to the northern section of the lake that remains unexplored by the consultant team spanning from the section noted above to the mouth of the Drakes Lagoon. Observation from both and points above indicate low lying ground with Carex prevailing at the water line. Where possible

an on-grade trail possibly 50-100 metres from the current water line would be best kept to higher ground subject to land/lease and ownership.



6. LAKE EDGE SOUTH OF MEREDITH PARK (BASED ON DRONE FOOTAGE AND ACCESS ALONG THE IRREWARRA ROAD EASEMENT) (No.6 on the map above)

To the camping ground's edge, there is direct access to the lake's foreshore for approximately 400 metres. The southern end of the foreshore associated with the camping ground terminates at a fence where recent replanting has been undertaken, probably by the property owner. Approximately 100 metres south of the start of Cypress trees, at the southern end of Meredith Park, it appears the water's edge is lined with mainly Phragmites.

Approximately 600 metres south of Meredith Park, the Lough Calvert infrastructure connects the drainage scheme to the lake, and indicates it is a lower lying ground without a cliff or embankment

Approximately 950 metres south of Meredith Park, there is a rock wall. The land between the tree line and water's edge appears relatively flat.

Approximately 1,050 metres south of Meredith Park, there is a Cypress hedge along the water's edge. It appears the land between the Cypress hedge and the water's edge is relatively flat.

Approximately 1,450 metres south of Meredith Park, there is a timber bridge and a rockwall further south. The land between the tree line and water's edge appears relatively flat.

Approximately 1,750 metres south of Meredith Park, it appears flat ground.

Approximately 2,350 metres south of the Park, the land between the fence line and the water's edge appears relatively flat.

The image shows the start of rocks, near Irrewarra Road, basalt rock beaching up to 4 metres height and there is a fence line running parallel to the water's edge. There is probably sufficient space between the base of the wall and the aquatic vegetation to establish a trail. The other alternative is to set the trail to the east side of the fence line within the assumed private property, subject to negotiation with the landowner.

7. IRREWARRA ROAD (

The next section investigated was the road easement line as the extension of Irrewarra Road which is a sealed road from the house and bus stop at the corner of Irrewarra Road and the Ballarat-Colac (Beeac) Road. The roughly 25-metre-wide grassed road reservation (easement) runs approximately 400 metres to the edge of the lake. At the easement's interface with the lake, there is a 4-5 metre embankment of 1:2 slope to the shoreline. The slope has substantial beaching of large basalt boulders and then a shoreline of approximately 40 metres of low lying Phragmites and Carex.

Approximately 130 metres north-west of the house, it appears there is a vehicle track. There maybe possibilites to use the vehicle track as a trail.

Approximately 1,300 metres south of the Irrewarra Road easement, there is a fence line to the water's edge. It appears flat ground with possiblities for the trail within water appears to be grassed strip above the aquatic vegetation.

Approximately 1,600 metres south of the Irrewarra Road easement, there is an embankment slope and some of the slope has rock beaching, it is heading south. It appears the trail could be located below the embankment and rock beaching. The other alternative is to set the trail to the east side of the fence line within the assumed private property pending negotiations with landowners.

8. THE RAILWAY CROSSING (No.8 on the map above)

A stop at the railway line crossing across Colac-Ballarat Road, Lincoln Kern of Practical Ecology indicated the landscape setting toward the lake is likely to be formed as a lunette resulting from wind depositing sand silt and shells from the lake.

9. THE SALEYARDS (No.9 on the map above)

A stop and access into the saleyards didn't provide access to the lake's edge. However, it was worth exploring on the team's next visit with OPS Engineers. There is a thin wedge of private property stretching between the property boundary of the saleyards and the lake's water edge. Walk along the railway and/or detailed desktop review from aerial photos and the drone footage.

10. THE WATER TREATMENT PLANT (No.10 on the map above)

The lake's edge is inaccessible at the frontage to the water treatment plant. Impenetrable thickets of woody weeds and phragmites prevented exploration.

This feasibility study indicates that a path on the east side of Lake Colac is a low priority given the range of complexities explored earlier in this report. However, if in the future Council wishes to progress a path, a consideration is to discuss with Barwon Water if a path could be created to the edge of the park – like grassed setting of the fenced water treatment plant. If not allowed by the Water Authority, then clearance of vegetation and building up fill material would be required.

The lake's edge is inaccessible at the frontage to the water treatment plant. Impenetrable thickets of woody weeds and phragmites prevented exploration.



Within the Water Treatment grounds, there is an embankment of what appears to be a 1:2 slope to the shoreline.

The Water Treatment Plant ground's has a 2.2m high cyclone mesh fence to the perimeter. There is impenetrable blackberries and phragmites to the lake's shoreline. Within the Water Treatment grounds there is mown grass that would provide a suitable grade and aspect for the trail subject to Barwon Water's permission to allow the trail and barrier fencing to be erected within their grounds.

11. THE BIRD SANCTURY AND THE TRAIL CONNECTION TO THE CARAVAN PARK AND THE BOTANICAL GARDENS (No.11 on the map above)

To the east of the botanic gardens, the existing 1.7-metre-wide exposed aggregate path crosses a number of drainage outflows and the extent of phragmites reeds signify how low lying the land is. The path to the east of a small car park area with informative signs on features of the area is a quartz and granitic sand track of approximately 2 metres width.







The eastern end of the existing pathway system terminates at the corner of Flaxmill Road and Clark Street at the Water Treatment Plant. The gravel path that extends from Clark Street to the Esplanade area was established as an access track for Barwon Water to maintain its infrastructure. Due to the high level of public use, Council does contribute to the track's maintenance.

.

Appendix E – Ecological Values at Lake Colac

Ecological Issues to Inform the Design of the Lake Colac Shared Trail

By Lincoln Kern

Introduction

This report will introduce the geology, natural history and current condition of vegetation and habitat with the aim of informing the design process for the proposed Lake Colac Shared Trail. The Lake Colac Shared Trail would potentially be constructed around the shoreline of Lake Colac and this report will help inform a feasibility study for the proposed shared trail. It is important to consider ecological values in designing such infrastructure to minimise impacts on indigenous flora and fauna so that when the environmental impact of the trail is considered at the permit stage the obligation to avoid, minimise and offset the loss of native vegetation and habitat is met.

Lake Colac is in the Victorian Volcanic Plains bioregion which is one of the largest volcanic plains in the world and also contains many lakes, varying greatly between salty and fresh water depending on the local geology, topography and water flows. This unique environment supports many habitats and native fauna species despite its modified state. It is a region of rich soils and often high rainfall so has been extensively developed for farming since European settlement. Many of the original indigenous flora and fauna and native habitats have been removed as part of the development of agriculture and urban development in the region and local area. However, there are some areas of native vegetation and significant threatened species present that will require consideration as part of the shared trail design process and within any planning approval processes.
The methods used to determine the possible design constraints and opportunities included:

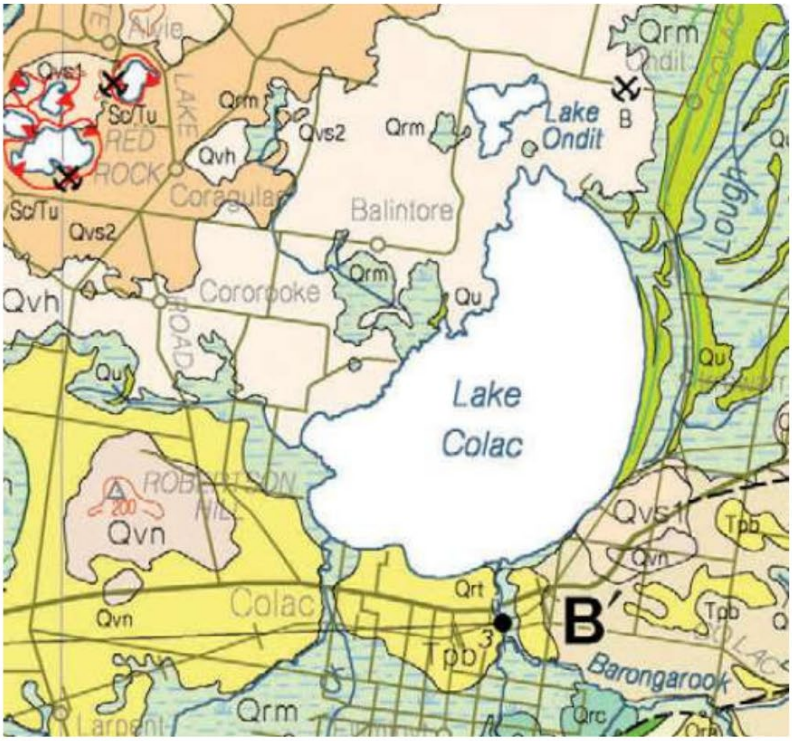
- The margins of Lake Colac were inspected in detail in November 2022 and conditions were generally assessed. The conditions included geology, topography and presence of native vegetation.
- Geological mapping was then sourced and compared with onsite observations.
- A threatened species search was conducted through the Victorian Biodiversity Atlas, including all threatened species of native flora and fauna listed under Victorian State legislation and the Commonwealth Environmental Protection and Biodiversity Conservation Act, and the locations of the records were mapped as presented below. This is a general assessment and further detailed work would have to be undertaken once a design is considered to consider the actual impact of the proposed trail.

This report will be structured to review the different conditions around Lake Colac, including geological substrates, indigenous flora and fauna observations, presence of native

vegetation including Ecological Vegetation Classes (EVCs), habitat values and threatened species records.

Geological Substrates

The geological substrate that underlies the shores of Lake Colac is important to consider because the original geological directly influences current topography and the soil conditions that can support different types of vegetation and habitats. After the site visit the geology mapping presented below matched well with the observations made on the ground.



Qrt *River and lake terraces: clay, sand, reworked tuff near Warrnambool; moderately sorted and poorly consolidated*

Qrm *Swamp, lake and estuarine deposits: clay, silt, sand, humic sand, peat, locally calcareous, minor* Coxiella *sand beds; moderately sorted and unconsolidated*

Qvh *Stony rise basalt, hummocky lava flows; olivine basalt, highly vesicular*

Qu *Lunette and lake beach deposits: clay, quartz sand,* Coxiella *shells, reworked tuff near Vaughan Island, minor swamp deposits; moderately sorted and unconsolidated*

Qvs1 *Scoria cones and agglutinated spatter rims: scoria, ash, lapilli, agglutinated lava spatter, volcanic bombs, minor lava flows and calcareous lithic fragments; massive to moderately bedded, poorly consolidated*

The geological substrates recorded in the geology maps support different topography, soils and habitats. The geology mapping presented above will help provide the background information to inform an assessment of the habitats present around the lake and the possible impacts on indigenous flora and fauna of the potential shared trail.

Native Vegetation and Habitats Present

The shores of Lake Colac have been greatly disturbed over time and very little native vegetation was observed in the site inspection. The shores are so disturbed that few intact patches of native vegetation were found.

Ecological Vegetation Classes (EVCs) are a method of systematic organisation of plant communities into common types that occur in similar environmental conditions throughout Victoria. Each vegetation type is identified on the basis of its floristic composition (the plant species present), vegetation structure (woodland, grassland, saltmarsh), landform (gully, foothill, plain) and environmental characteristics (soil type, climate). EVCs are the framework for classifying native vegetation and determining its significance

It should be noted that with the significant and extensive disturbance across the Victorian Volcanic Plains most EVCs in the bioregion are Endangered, meaning less than 10% are extant, with a minority considered Vulnerable, meaning less than 30% are extant. This means that almost any native vegetation patches are ecologically significant and the best efforts to avoid and minimise losses of native vegetation should be made during the design process.

Threatened vegetation communities such as the Western Basalt Plains Grassland (listed under the Victorian FFG Act) and Natural Temperate Grassland of the Victorian Volcanic Plain (VVP) and Grassy Eucalypt Woodland of the VVP (listed under the Commonwealth EPBC Act have been recorded in the local area. However, it is clear that little if any of these vegetation communities occur around the margins of Lake Colac because of the lack of suitable habitat and the extensive historic disturbance.

The northwest section of the Lake Colac foreshore where the stony rises occur along the shoreline there is very little native vegetation present. The groundstorey is predominantly exotic pasture grasses with many scattered indigenous Tree Violets on many stony rises as well as many scattered Red Gums *Eucalyptus camaldulensis*. The stony rises are irregular cooled lava flows with lots of surface rock and random upwellings of lava creating a very rocky landscape with rock piles of various sizes scattered through the landscape. These stony rises would formerly have supported EVCs such as 649 Stony Knoll Shrubland or 203 Stony Rise Woodland but only minimal remnants of these native vegetation communities remain.

There were some extensive sections of simplified wetland vegetation along some of the Lake Colac foreshore in areas where cattle grazing doesn't occur and where the soils are gently sloping with low relief deposits such as the delta at the mouth of Deans Creek and along the eastern edge of the lake below the lunette deposited by dominant westerly winds over the past millennia. Stands of the native reed *Phragmites australis* occur across large areas but very few other native flora species are present. These vegetation communities are very difficult to classify as an EVC and would be more properly be considered as a product of significant disturbance with one indigenous flora species overwhelmingly responding to grow in the ecological gap created by extensive clearing and disturbance.

However, many areas of the foreshore are grazed without fences so there is no native vegetation along the lake shore across large sections. These sections will be easier to design a shared trail because of the lack of vegetation and a trail can create the opportunity to implement vegetation restoration works that enhances habitat for native fauna.

There were very few records of threatened flora along the Lake Colac Foreshore. This was expected given the disturbed nature of the lake foreshore and local agricultural history and the site inspection confirmed the disturbed nature of the foreshore with very limited occurrences of native vegetation.

As explained above it should be fairly straightforward to design around the limited areas of native vegetation present. The areas of native vegetation often occur on higher rockier areas of stony rises providing the opportunity to avoid impacts on the limited areas of native vegetation present. Despite the degraded state of the Lake Colac foreshore there are still extensive areas of habitat used by threatened species that need to be considered, as detailed below.

Threatened Fauna Present

A review of the threatened fauna records indicated that there is one reptile species, Corangamite Water Skink, and a suite of native water birds that have continued to use the habitat in and around Lake Colac after many years of agricultural development and farming in the local region. I have reviewed the various species observed around the lake in recent decades and determined the species that may prove problematic to manage in the shared trail design and approval process. This section will describe the relevant threatened fauna species present, their ecology and how to potentially avoid and minimise impacts on the species.

Corangamite Water Skink

Eulamprus tympanum marnieae

This species is considered endangered under the Victorian Flora and Fauna Guarantee Act and the Commonwealth Environmental Protection and Biodiversity Conservation Act (EPBC). It is limited to 30 populations around lakes on the Victorian Volcanic Plain bioregion between Lakes Colac and Bolac with about 4 populations estimated to occur at Lake Colac. With its' rarity, legal status and significant populations on the fringes of Lake Colac it will be one of the most important species to consider in the design process.

As per Robinson *et al* (2003): *Analyses of microhabitat use by Peterson (1997) support this view - areas of high shrub density, short distance to vegetation cover, large rock aggregations and rock fissures appeared to be selectively chosen by the Corangamite Water Skink, and were positively correlated with presence of the lizard*.

While little is known of the diet of the Corangamite Water Skink, one may expect it to be largely insectivorous, like its congeners. It does, however, also consume the fruit of the Tree Violet, which may be an important component of the diet during some periods (Peterson 1997). Lizards may also play an important role in the dispersal and germination of this plant.

Unlike other water skinks, the Corangamite Water Skink is an extremely shy species. Usually observed perched on a rock-pile or fence, it will often take cover when a human observer is still tens of metres distant (Hutchinson and Rawlinson 1995). It can and does swim, but usually takes refuge in deep gaps and fissures in rock piles.

As the excerpts presented from the FFG Action Statement (Robinson *et al* 2003) detail the Corangamite Water Skink is very reliant on the stony rise ecosystem. A great deal of potential and likely habitat for this species was observed in the field with the stony rises on the northwest margins of Lake Colac. The species likely uses rocks along lake shores to bask and forage in areas where they can prey on insects using the lake margin and fruits of Tree Violets *Melicytus dentatus* and also have immediate access to rock crevices for protection from predators. Managing impacts on the Corangamite Water Skink will be critical in achieving any shared trail but for this species is limited to the areas of lake foreshore with stony rises on the northwest edges.

It should also be noted that Corangamite Water Skinks are easily disturbed. If the animals are disturbed often their fitness can be degraded by stress and investing energy in threat avoidance rather than foraging for food. Ongoing disturbance could cause habitat to be less suitable for the species as well. If the trail is placed close to areas where the species occurs, as indicated by the records presented below, the impacts of direct loss of habitat and ongoing disturbance by trail users need to be taken into account. This means that it is possible that any trail users will disturb the individuals every time they pass an area where they live and the very purpose and intent of the trail, i.e. regular use by people for fitness and relaxation is the process that is problematic for the species.

Migratory Water Birds

As the maps presented below threatened fauna there are many species of water birds that have been observed using the open waters of Lake Colac and the habitats along the lake foreshore, likely both terrestrial habitats as well as the shallow wetlands that occur along the lake shores. The guild of water bird species using the habitat around the lake includes many species listed under the Victorian Flora and Fauna Guarantee Act as well as many migratory water birds listed under the Commonwealth EPBC Act.

Managing impacts on significant water birds will be an important design principle. It is clear from the historic fauna records that many water birds use open water out in the lake and there should be minimal impacts on that habitat use. However, the shallow wetlands on the

margins of the lake shore, open low relief slopes and areas of open reed will also provide habitat for various water bird species. Managing impacts on water birds will partially be about minimising disturbance by the trail users as any habitat will be less useful if any birds are regularly disturbed by trail users, including people and their dogs.

Overview of Ecological Conditions and Shared Trail Design Issues

Geological Substrate	Equivalent Labelling on Map1	Topography and Landscape Description	Potential Indigenous Flora and Fauna Issues
QRT River and lake Terraces	Not applicable	The town of Colac was constructed on the terraces created by lake deposition at different levels over time.	This section is almost entirely developed as the town of Colac with a foreshore trail already developed. Further development is not required nor requires assessment.
QRM Swamp, lake and estuarine deposits	Deans Creek Delta Deposits Lagoon Deposits	These deposits occur in four areas around the lake, around the deltas of Barongarook and Deans Creeks on the south, on the smaller connected lakes to the northwest and on the northeast. These deposits result in long gentle slopes of good dark soils, often with stands of reeds if grazing isn't occurring down to the water's edge.	These areas sometimes have stands of reeds and shallow wetland vegetation along the lake edge. These important water bird habitats will need to have distance between the trail and the lake edge. It may also be possible to restore much habitat for water birds because areas of grazed foreshore will need to be restored if the trail is built as stock access won't generally be compatible with the shared trail.
Qvh Stony rise basalt	Stony Rise Margins	These formations are on the northwest edge of the lake stretching to Meredith Park on the northeast corner. The rough stony rises have native shrubs and scattered Red Gums.	The stony rises are the very specific habitat of the Corangamite Water Skink. The thorny Tree Violet and Sweet Bursaria shrubs will also provide habitat for various small passerines. The shared trail should create as much distance as possible between stony rises with access to the waters' edge and the trail.
Qu Lunette beach deposits	Eastern Lunette Deposits	This geological formation is a result of the dominant westerlies pushing sand east forming a moon-shaped dune on the east margin of the lake.	The lunette has mostly been cleared here with very little native terrestrial habitats. However, much of the waters' edge is shallow with reed beds along the waters' edge, which is habitat that will often be used by water birds as detailed above. Again, as much distance as possible between the lakes' edge and the shared trail should be considered. Other measures such as protective

Geological Substrate	Equivalent Labelling on Map 1	Topography and Landscape Description	Potential Indigenous Flora and Fauna Issues
			fencing and strategic screens may also be useful.
QVS1 Scoria cones	Basalt Deposits with Lakeside Cliffs	This geological formation is limited to the southeast corner of the lake, just to the east of the Colac township.	This is a very limited section of the lake foreshore with significant disturbance. It likely doesn't support habitat for the Corangamite Water Skink but water birds will still be an issue to address.

Discussion

Iwill begin byreviewing the recent history of environmental management around Lake Colac and how it might impact shared trail design. After many decades of intensive agricultural development around the lake shore, in the catchment and development of point sources of water pollution, including milk processing plants, water treatment plants and other industrial facilities water pollution in Lake Colac was extensive and problematic. Macroplan (2002) assessed the issues and developed an extensive management plan to address the issues. The point sources of pollution from industrial sources were addressed over time and the degradation caused by livestock grazing on the lake shore was addressed through private land acquisition on the foreshore with fencing on private land to address the nutrient pollution and disturbance caused by stock grazing. Much of the public land along the lake foreshore was acquired to help address the pollution issues and this past action partially created the opportunity for a shared trail. Shared trail development could include further private land acquisition to facilitate both human recreation, restoration of native habitats and further pollution control. Strategic land acquisition, to make space inbetween the shared trail and sensitive habitats, could easily be part of the required efforts to mitigate impacts of the shared trail on threatened species.

It should be remembered that most habitats in the VVP bioregion are depleted and degraded. Any efforts to have more strategic land in the VVP bioregion available for restoration and conservation management is at least useful and potentially important in restoring the indigenous biodiversity of the VVP landscape. There may be concerns that human recreational use would compromise the habitat of threatened species, since Corangamite Water Skinks and water birds are sensitive to human disturbance (and their dogs) but the opportunity to reduce grazing by domestic stock and restore habitats along the lake foreshore could be an important part of mitigating impacts of the shared trail as well. Recreational trails and their land corridors have often become a focus for conservation management across Victoria significantly improving habitat availability and corridors, despite the human disturbance that comes with them as people bring care and resources for management to the space as well, and this shared trail provides a similar opportunity.

The most significant ecological impact of the shared trail is likely to be disturbance of important habitats by people and possibly dogs that come with them. The actual construction footprint is likely to be of minimal impact because of the lack of native vegetation present. Consequently, achieving maximum distance between the shared trail and stony rises bordering the lake and wetland habitats on the waters' edge is the highest priority. Stony rise habitat extends beyond the lakes' edge as well and this could be problematic as Corangamite Water Skinks might live across stony rises distant from the waters edge. The next section will summarise specific recommendations for shared trail design to mitigate the potential impacts of the trail.

The irony with shared trails in significant habitats is that the core intent of the trail, i.e. having recreational access by people and often their dogs, is the exact impact that is problematic for threatened fauna species. In addition, the more popular the trail the greater the impact on sensitive habitats can be. As discussed above, a shared trail and its corridor can become public open space that is cared for by more people so a conservation management focus for the land is possible. The Lake Colac foreshore is sensitive habitat but it also has access issues for a shared trail and areas where access is difficult and structures such as boardwalks are required can help control access and disturbance to remnant and restored habitat. In general, the shared trail design should take opportunities to control access to sensitive habitats by people and dogs where possible and appropriate.
If there are significant impacts on threatened flora and fauna species through the construction of the shared trail then biodiversity offsets and actions to mitigate the possible impacts will be required. Biodiversity offsets can be required under the Victorian Planning and Environment Act and the Commonwealth EPBC Act. There is unlikely to be any offsets required under Clause 52.17 of the Colac Otway Planning Scheme because of the lack of native vegetation present and the ability to design around possible native vegetation present. However, the general impacts on threatened flora and fauna do need to be considered under any planning permit process under the Victorian Planning and Environment Act and Flora and Fauna Guarantee Act. Direct offsets are also unlikely under the Commonwealth EPBC Act for Corangamite Water Skinks and migratory birds but protecting their habitat during the design process and the consideration and inclusion of any mitigating actions in the design proposal to reduce the impact on relevant species will be critically important.

In summary, there is minimal native vegetation and native habitats around the Lake Colac foreshore. However, some listed threatened species are present and must be considered in any design process with avoidance of impacts being the highest priority and the development of mitigation actions to minimise impacts as a second priority. The Corangamite Water Skink, migratory birds and possibly other species do create potentially difficult management issues when designing and implementing a shared trail around Lake Colac. However, the shared trail is also a great opportunity to protect and restore habitats around the lake to mitigate any impacts on threatened species, continue to implement

actions that can improve water quality and contribute the deplorable state of natural ecosystems and habitat in the Victorian Volcanic Plain Bioregion.

Recommendations for Shared Trail Design

In general, the following actions are recommended to reduce the impact of the shared trail on native vegetation and threatened species habitats:

1. Set back the shared trail from the lake shore as much as possible to prevent disturbance of stony rises and wetland margins on the lakes' edges, the most important habitats for threatened species.
2. It is likely that access to the lake edge will be desirable for visitors so any viewpoints, fishing access and access for dogs swimming will need to be placed in areas with less habitat values.
3. When stony rises and/or shallow wetland edges are adjacent to the lakes' edge consider extra methods to limit disturbance, such as boardwalks, screens, bollards, extra fencing etc.
4. Require dogs to be on lead on the shared trail at minimum, with strategic places with less habitat values and more space without habitat considered for off lead spaces. Prohibiting dogs may even need to be considered in the extreme if regulatory authorities are concerned about human and dog disturbance on threatened fauna.
5. Consider opportunities or requirements for ecological restoration and conservation management along the trail corridor. Some of this work may be important for obtaining approval for the shared trail as it can be mitigation for the potential negative impacts of the trail.

References

MacroPlan Pty. Ltd. (June 2002). *LakeColacManagementPlanDraftManagementPlan-ColacOtway Shire Council* MacroPlan Pty. Ltd. North Melbourne Vic 3003

Peterson, G. and Robertson, P. (2011). *RecoveryPlanforCorangamiteWaterSkinkEulamprustympanum marnieae*. Department of Sustainability and Environment, Melbourne.

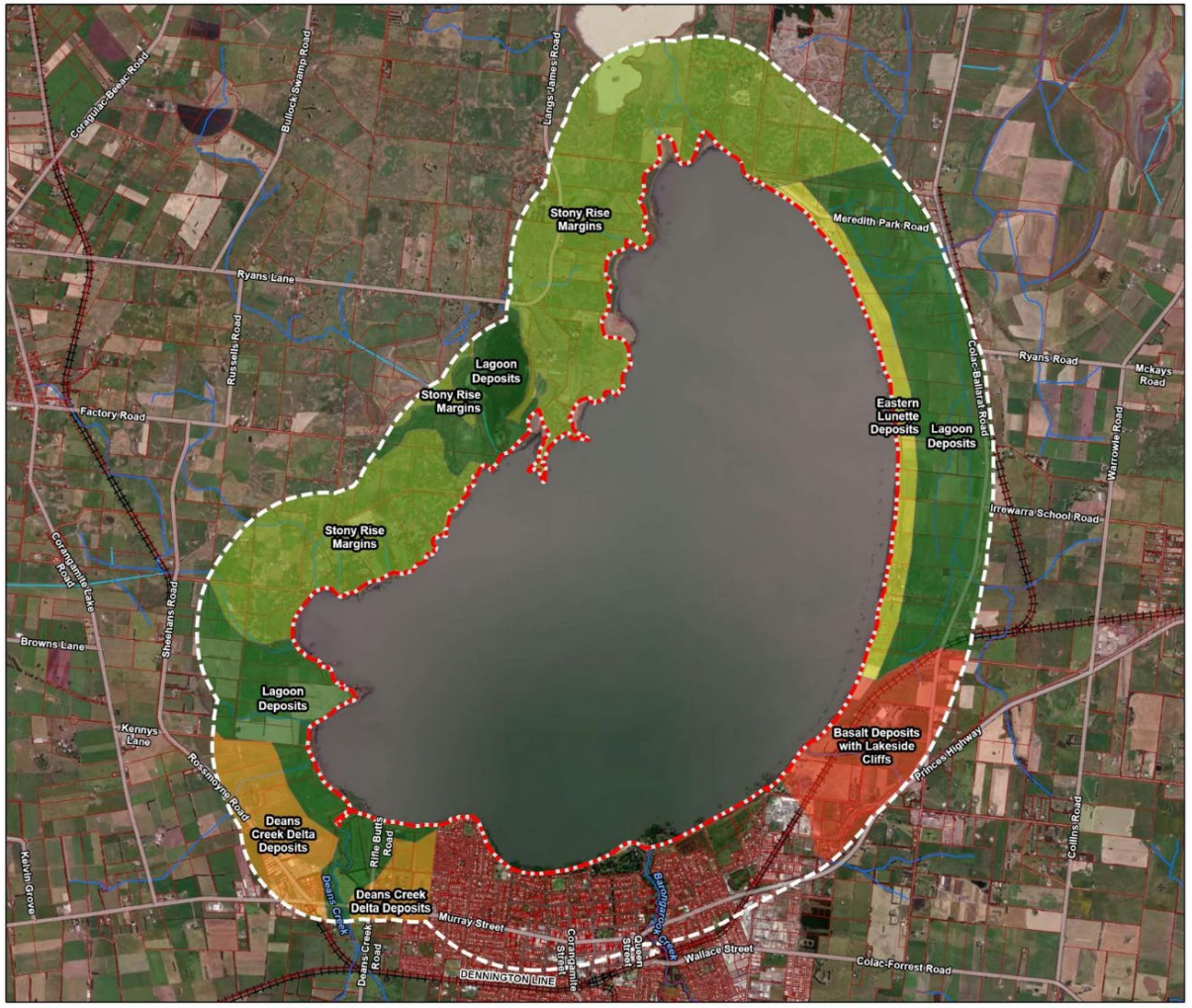
Robertson, P., Peterson, G. and Lowe, K. (2003). *ActionStatementNo.142–CorangamiteWater Skink Eulamprus tympanum marnieae*. Published by the Department of Sustainability and Environment, Victoria.

Appendix 1. Listed Species in Local Area

Victorian Biodiversity Atlas, Species Summary List
(Date: 05/08/2022 02:40 PM)

Common Filter						
Conservation Status:	EPBC, FFG	Taxon Level:	Species	Date Since:	01/01/1980(dd/mm/yyyy)	
Total Records						
39						
Last Review Date:25 Jun 2022						
Search Result						
Taxon ID	Scientific Name	Common Name	FFG Status	Conservation Status	Treaty	Last Record
1668	Geocharax falcata	Western Bush Yabby	Endangered	en		9/10/2007
1692	Engaeus sericatus	Hairy Burrowing Crayfish	Vulnerable	vu		1/01/2008
10045	Lewinia pectoralis	Lewin's Rail	Vulnerable	vu		28/10/2018
10111	Gelochelidon macrotarsa	Australian Gull-billed Tern	Endangered	en		7/11/2004
10112	Hydroprogne caspia	Caspian Tern	Vulnerable	vu	camba,jamba	25/10/2018
10154	Tringa glareola	Wood Sandpiper	Endangered	en	bonnA2H,camba,jamba,rokamba	2/01/2018
10157	Actitis hypoleucos	Common Sandpiper	Vulnerable	vu	bonnA2H,camba,jamba,rokamba	15/11/2017
10158	Tringa nebularia	Common Greenshank	Endangered	en	bonnA2H,camba,jamba,rokamba	23/01/2019
10159	Tringa stagnatilis	Marsh Sandpiper	Endangered Critically	en	bonnA2H,camba,jamba,rokamba	12/02/2020
10161	Calidris ferruginea	Curlew Sandpiper	Endangered Critically	CR cr	bonnA2H,camba,jamba,rokamba	12/02/2020
10170	Rostratula australis	Australian Painted-snipe	Endangered	EN cr	camba	20/02/1980
10177	Antigone rubicunda	Brolga	Endangered	en		7/11/1999
10185	Egretta garzetta	Little Egret	Endangered	en		31/01/2019
10186	Ardea intermedia plumifera	Plumed Egret	Critically Endangered	cr		17/12/2018
10187	Ardea alba modesta	Eastern Great Egret	Vulnerable	vu	camba,jamba	9/11/2020

10197	Botaurus poiciloptilus	Australasian Bittern	Critically Endangered	ENcr		4/11/2019
10199	Anseranas semipalmata	Magpie Goose	Vulnerable	vu		23/10/2017
10212	Spatula rhynchotis	Australasian Shoveler	Vulnerable	vu		17/06/2019
10214	Stictonetta naevosa Aythya	Freckled Duck	Endangered	en		25/10/2019
10215	australis Oxyura australis	Hardhead	Vulnerable	vu		25/10/2019
10216	Biziura lobata Accipiter	Blue-billed Duck	Vulnerable	vu		19/01/2019
10217	novaehollandiae Hieraaetus	Musk Duck	Vulnerable	vu		16/09/2018
10220	morphnoides Haliaeetus	Grey Goshawk	Endangered	en		4/05/2019
10225	leucogaster Falco subniger	Little Eagle	Vulnerable	vu		13/03/2019
10226	Callocephalon fimbriatum	White-bellied Sea-Eagle	Endangered Critically	en	camba	22/01/2019
10238	Polytelis swainsonii	Black Falcon	Endangered	cr		30/03/2019
10268	Hirundapus caudacutus	Gang-gang Cockatoo		EN		27/11/2018
10277	Anthochaera phrygia	Superb Parrot	Endangered	VUen		1/01/1996
10334	Pteropus poliocephalus	White-throated Needletail	Vulnerable Critically	VUvu	camba,jamba,rokamba	18/03/2019
10603	Litoria raniformis	Regent Honeyeater	Endangered	CRcr		28/12/1982
11280	Eulamprus tympanum marnieae	Grey-headed Flying-fox	Vulnerable	VUvu		16/04/2020
13207	Eucalyptus kitsoniana	Growling Grass Frog	Vulnerable	VUvu		20/01/2010
62958	Geranium brevicaule	Corangamite Water Skink	Endangered	ENen		28/03/2018
501290	Lepidium aschersonii	Bog Gum	Critically Endangered	cr		3/11/2008
501433	Melaleuca armillaris subsp. armillaris Poa sallacustris	Alpine Crane's-bill	Endangered	en		2/02/2012
501897	Eucalyptus globulus subsp. globulus	Spiny Peppercress	Endangered	VUen		28/06/2019
502145		Giant Honey-myrtle	Endangered	en#		25/11/2008
503891		Salt-lake Tussock-grass	Critically Endangered	VUcr		16/09/2014
504491		Southern Blue-gum	Endangered	en#		3/11/2008



Map 1. Geological Substrates and Current Conditions

Lake Colac, Colac

Legend

- Subject Site
- Subject Site Buffer (1km)
- Parcels
- Constructed watercourse
- Natural watercourse
- Railways

Geological Substrates

- Basalt Deposits with Lakeside Cliffs
- Deans Creek Delta Deposits
- Eastern Lunette Deposits
- Lagoon Deposits
- Stony Rise Margins

Details

Mapping by: Ali Nia
Date: 12/16/2022
Version: 1
Aerial photography from Esri World Imagery.
Data Source: Base layers courtesy of VicMap,
Copyright © State of Victoria.

N

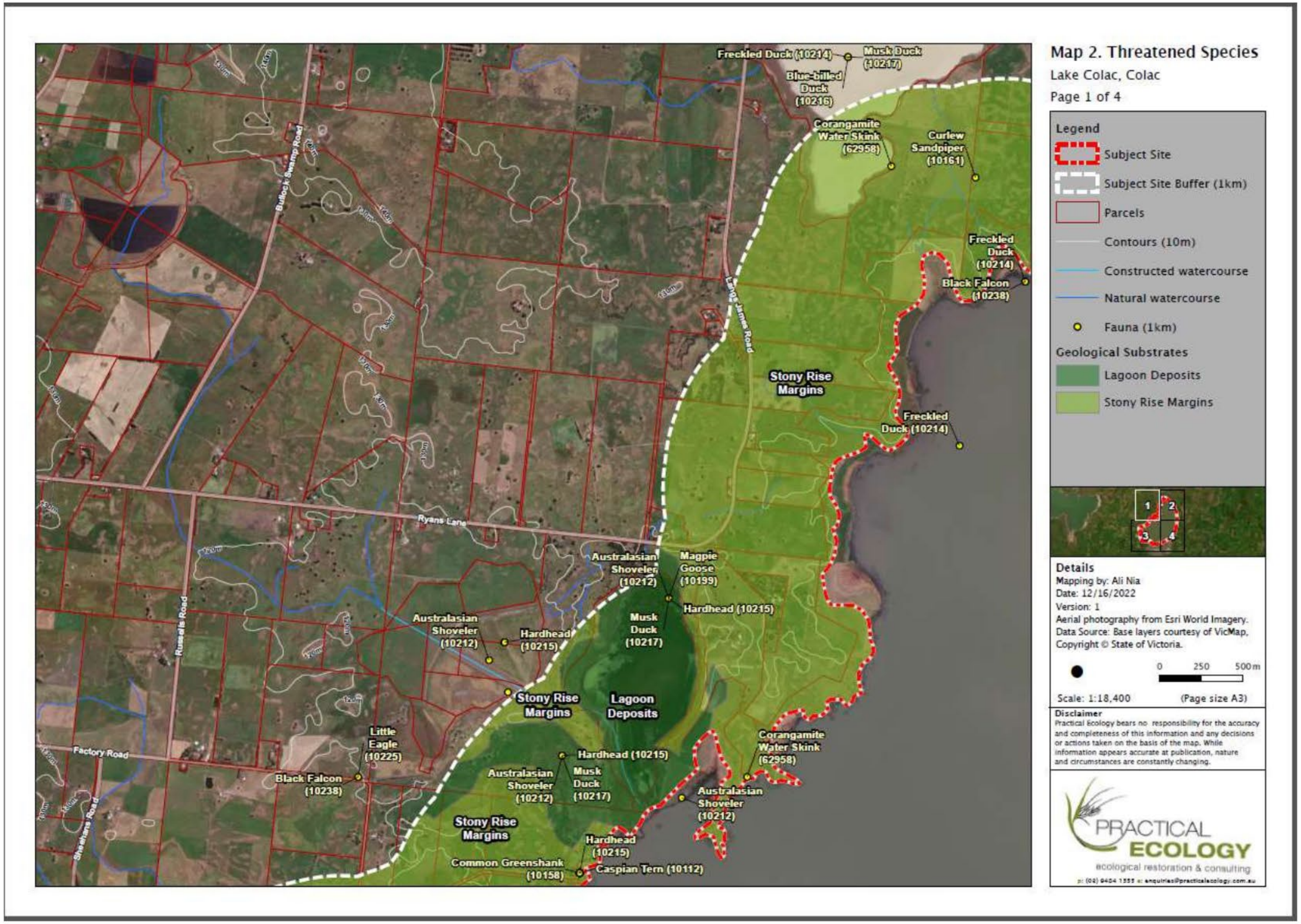
0 500 1000 m

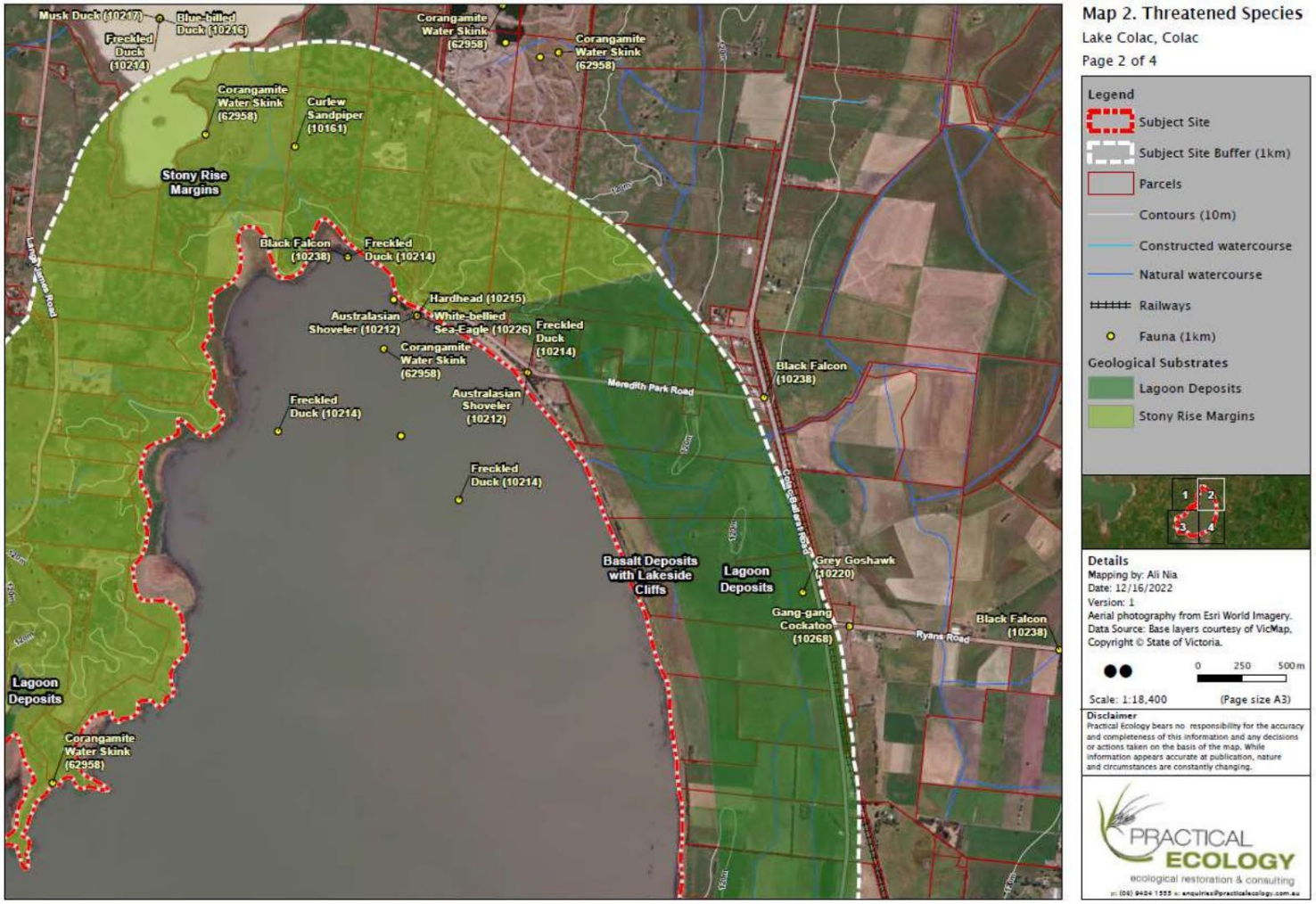
Scale: 1:38,000 (Page size A3)

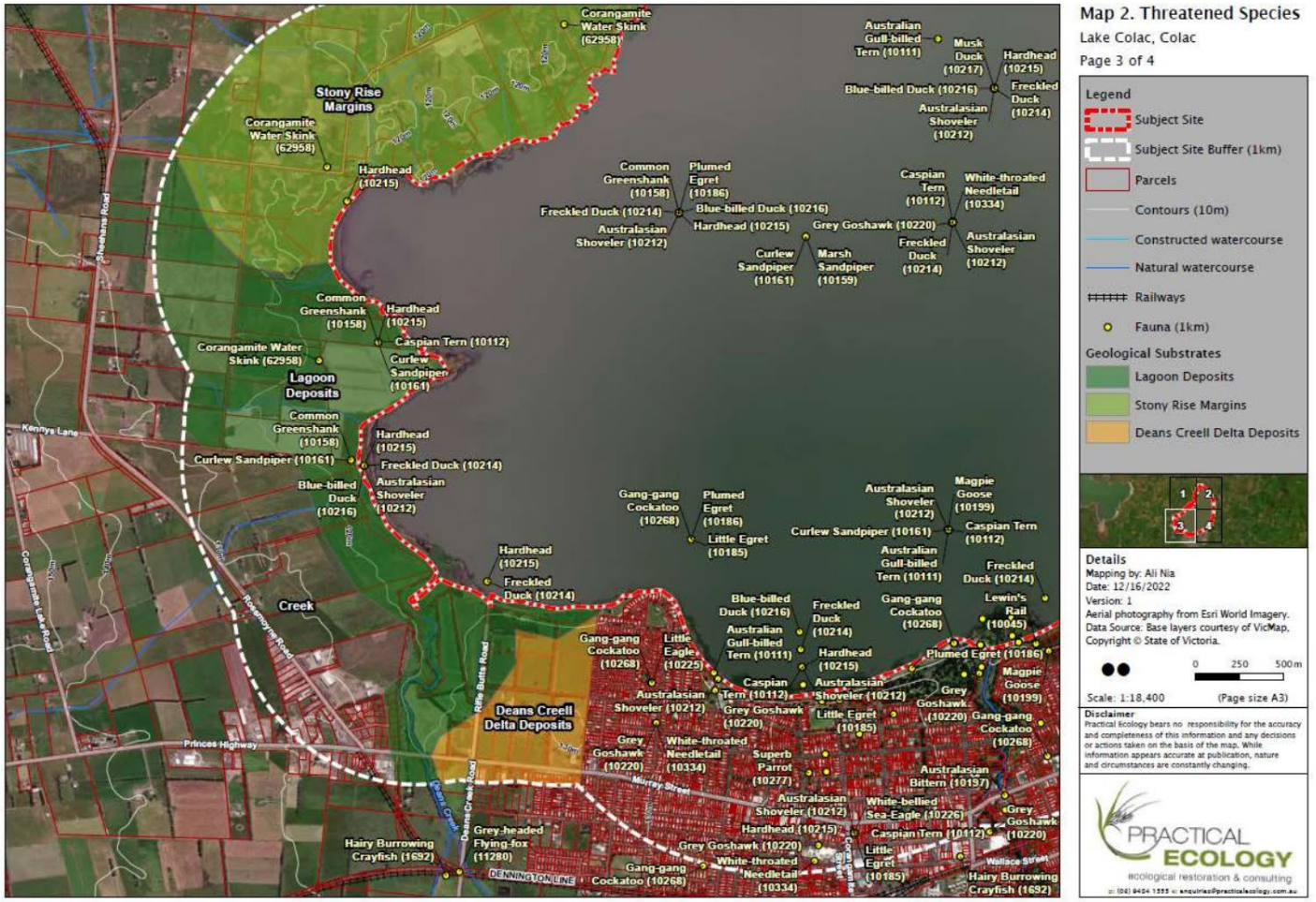
Disclaimer

Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

PRACTICAL ECOLOGY
ecological restoration & consulting
p: (03) 9484 1555 e: enquiries@practicalecology.com.au


Map 2. Threatened Species
Lake Colac, Colac
Page 1 of 4
Legend
Subject Site
Subject Site Buffer (1km)
Parcels
Contours (10m)
Constructed watercourse
Natural watercourse
Fauna (1km)
Geological Substrates
Lagoon Deposits
Stony Rise Margins
Details
Mapping by: Ali Nia
Date: 12/16/2022
Version: 1
Aerial photography from Esri World Imagery.
Data Source: Base layers courtesy of VicMap, Copyright © State of Victoria.
0 250 500m
Scale: 1:18,400
(Page size A3)
Disclaimer
Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.
PRACTICAL ECOLOGY
ecological restoration & consulting
Freckled Duck (10214)
Musk Duck (10217)
Blue-billed Duck (10216)
Corangamite Water Skink (62958)
Curlew Sandpiper (10161)
Freckled Duck (10214)
Black Falcon (10238)
Stony Rise Margins
Freckled Duck (10214)
Australasian Shoveler (10212)
Magpie Goose (10199)
Hardhead (10215)
Musk Duck (10217)
Australasian Shoveler (10212)
Hardhead (10215)
Stony Rise Margins
Lagoon Deposits
Little Eagle (10225)
Black Falcon (10238)
Hardhead (10215)
Australasian Shoveler (10212)
Musk Duck (10217)
Stony Rise Margins
Common Greenshank (10158)
Hardhead (10215)
Caspian Tern (10112)
Corangamite Water Skink (62958)
Australasian Shoveler (10212)
Bullock Swamp Road
Ryans Lane
Russells Road
Factory Road
Sheehans Road
Lang James Road


Musk Duck (10217)
Blue-billed Duck (10216)
Freckled Duck (10214)
Corangamite Water Skink (62958)
Corangamite Water Skink (62958)
Corangamite Water Skink (62958)
Curlew Sandpiper (10161)
Stony Rise Margins
Black Falcon (10238)
Freckled Duck (10214)
Hardhead (10215)
Australasian Shoveler (10212)
White-bellied Sea-Eagle (10226)
Freckled Duck (10214)
Corangamite Water Skink (62958)
Meredith Park Road
Black Falcon (10238)
Australasian Shoveler (10212)
Freckled Duck (10214)
Freckled Duck (10214)
Basalt Deposits with Lakeside Cliffs
Lagoon Deposits
Grey Goshawk (10220)
Gang-gang Cockatoo (10268)
Ryans Road
Black Falcon (10238)
Lagoon Deposits
Corangamite Water Skink (62958)
Map 2. Threatened Species
Lake Colac, Colac
Page 2 of 4
Legend
Subject Site
Subject Site Buffer (1km)
Parcels
Contours (10m)
Constructed watercourse
Natural watercourse
Railways
Fauna (1km)
Geological Substrates
Lagoon Deposits
Stony Rise Margins
Details
Mapping by: Ali Nia
Date: 12/16/2022
Version: 1
Aerial photography from Esri World Imagery.
Data Source: Base layers courtesy of VicMap,
Copyright © State of Victoria.
0 250 500 m
Scale: 1:18,400 (Page size A3)
Disclaimer
Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.
PRACTICAL ECOLOGY
ecological restoration & consulting



Map 2. Threatened Species

Lake Colac, Colac

Page 3 of 4

Legend

- Subject Site
- Subject Site Buffer (1km)
- Parcels
- Contours (10m)
- Constructed watercourse
- Natural watercourse
- Railways
- Fauna (1km)

Geological Substrates

- Lagoon Deposits
- Stony Rise Margins
- Deans Creell Delta Deposits

Details

Mapping by: Ali Nia
Date: 12/16/2022
Version: 1
Aerial photography from Esri World Imagery.
Data Source: Base layers courtesy of VicMap.
Copyright © State of Victoria.

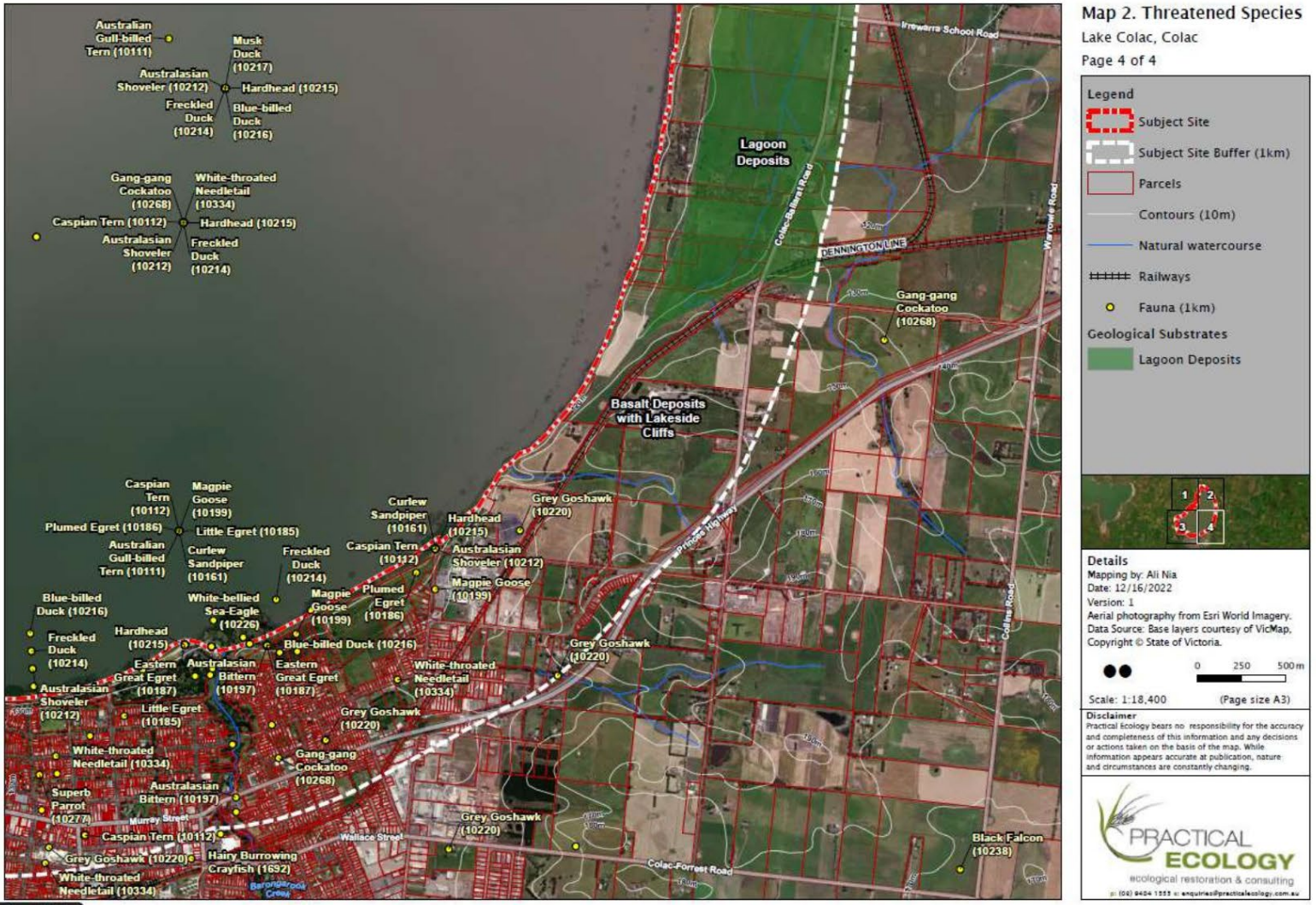
0 250 500m

Scale: 1:18,400 (Page size A3)

Disclaimer

Practical Ecology bears no responsibility for the accuracy and completeness of this information and any decisions or actions taken on the basis of the map. While information appears accurate at publication, nature and circumstances are constantly changing.

PRACTICAL ECOLOGY
ecological restoration & consulting



16.54 x 11.69 in

Appendix F – Opinion of Probable Costs

Fees for Cultural Heritage investigations

Task	Quantity	Rate	Amount
A1. Project Establishment - Meetings, Consultation and Admin	15:00	240.00	3,600.00
Senior Project Manager			
A2. Project Establishment - GIS	1:00	180.00	180.00
GIS Services			
B1. Desktop Assessment - Background Research 15:30 160.00 2,480.00	15.30	160.00	2,480.00
Project Archaeologist			
B2. Desktop Assessment - GIS	15.00	180.00	2,700.00
GIS Services			
C1/D1. Standard/Complex Assessment - OHS and Pre Project Admin	4.00	240.00	960.00
Senior Project Manager			
C2/D2. Standard/Complex Assessment - GIS	15.00	180.00	2,700.00
GIS Services			
C3. Standard Assessment - Undertake Fieldwork	124.30	240.00	29,880.00
Senior Project Manager			
C4. Standard Assessment - Undertake Fieldwork	124.30	160.00	19,920.00
Field Archaeologist			
D1. Complex Assessment - Undertake Fieldwork	664.00	200.00	132,800.00
Lead Field Archaeologist			
D2. Complex Assessment - Undertake Fieldwork	664.00	160.00	106,240.00
Field Archaeologist			
E1. Report Phase - Draft and Final Report	22.30	240.00	5,400.00
Senior Project Manager			
E2. Report Phase - Draft and Final Report	75.00	160.00	12,000.00
Project Archaeologist			
E3. Report Phase - GIS	37.30	180.00	6,750.00
GIS Services			
E4. Report Phase - Data Processing	76.00	160.00	12,160.00
Project Archaeologist			
FIXED COST ITEMS			
F - NOI inc 10% admin fee	1.00	165.33	165.33
Notice of intention to prepare a cultural heritage management plan			
F – Aboriginal Cultural Heritage Register and Information System (ACHRIS) inc 10% admin fee	1.00	297.60	297.60
Application to access register			
F - Mileage	6878	1.05	7,221.90
Mileage $1.05 per km			
F – Differential Global Positioning Systems (DGPS)	95.00	200.00	19,000.00
DGPS Hire $200 per day			
F - Accommodation	190.00	180.00	34,200.00
Accommodation per person per night			
F - Per Diem	190.00	180.00	26,600.00
Per Diem per person			
F - Disbursements	19.00	80.00	1,520.00
Disbursements			
F - Evaluation Fee inc 10% admin fee	1.00	4,149.78	4,149.78
Complex Assessment CHMP approval (1 authority) large activity area			
F - Eastern Maar - Meeting	3.0	1,440.00	4,320.00
Eastern Maar			
F - Eastern Maar - Fieldwork	190.00	1,900.00	361,000.00
Eastern Maar			
Subtotal 796,244.61			**796,244.61**
Tax GST			**79,624.46**
Total			**875,869**

Elements

Concrete pathways

Description	Quantity	Unit	Rate	Subtotal	Total
Concrete path length - 1.38kms					
Drainage at 20 metre spacings					
2500mm wide path with 600mm shoulders		Note			
Strip and prepare subgrade - 300mm deep	5,520	m2	15.00	82,800	82,800
150mm Class 3 compacted crushed rock x 2 layers	5,520	m2	40.00	220,800	220,800
225mm deep compacted selected gravel between drainage points	5,520	m2	30.00	165,600	165,600
Concrete path - 150 thick 25 MPa concrete, SL82 mesh	3,450	m2	125.00	431,250	431,250
Gravel to 600mm wide shoulders - 150mm thick	2,760	m	17.50	48,300	48,300
3600mm long x 225 dia FRCP	70	No	725.00	50,750	50,750
End walls and beaching	140	No	250.00	35,000	35,000
Allows for restricted access, small plant and equipment		Note			

1,034,500

Gravel pathways

Description	Quantity	Unit	Rate	Subtotal	Total
Gravel path length - 37.4kms					
2500mm wide path with 600mm shoulders		Note			
Strip and prepare subgrade - 250mm deep	93,500	m2	12.50	1,168,750	1,168,750
150mm Class 3 compacted crushed rock	93,500	m2	22.50	2,103,750	2,103,750
100mm compacted selected gravel path	93,500	m2	32.50	3,038,750	3,038,750
Shoulder treatments - 600mm wide	74,800	m	17.50	1,309,000	1,309,000
Allows for restricted access, small plant and equipment		Note			

7,620,250

Boardwalks

Description	Quantity	Unit	Rate	Subtotal	Total
Boardwalk construction – 2500mm wide at property No. 31	400	m	3,000.00	1,200,000	1,200,000

1,200,000

Retaining walls

Description	Quantity	Unit	Rate	Subtotal	Total
Low height retaining walls – not exceeding 500mm high	500	m	300.00	150,000	150,000

150,000

Fencing

Description	Quantity	Unit	Rate	Subtotal	Total
Farm fencing between pathway and adjacent land - Five wire strands with timber posts and star picket droppers.	39,180	m	50.00	1,959,000	1,959,000
Electric fencing single strand on cattle side of fence (recommended option)	39,180	m	5.00	195,900	195,900

2,154,900

Swale drains

Description	Quantity	Unit	Rate	Subtotal	Total

Form swale drains adjacent concrete pathways	1,380	**m**	50.00	69,000	69,000
Form swale drains adjacent gravel pathways	37,400	**m**	50.00	1,870,000	1,870,000

1,939,000

Council administration

Estimated costs for officer management and coordination of pre-planning tasks to get project construction ready.
Activities would involve but are not limited to:

- preparation of tender specifications (for ecological assessment, survey and conservation study on the Corangamite Water Skink, cultural heritage investigations, boundary re-establishments, feature and level surveying, geotechnical investigations, detailed design).
- tender advertising and evaluations
- consultant/contractor management
- community engagement with all private and public landowners to access properties as required.
- Negotiation of land ownership/purchase/transfer/lease/licence arrangements with public and private landowners as required.

Allow $250,000 for a Senior Project Manager.

Accessible car parks

Description	Quantity	Unit	Rate	Subtotal	Total
Accessible car parks for nominal 5 No cars:					
Boylans Road	1	**No**	20,000.00	20,000	20,000
Ryans Lane	1	**No**	20,000.00	20,000	20,000

40,000

Signage

Description	Quantity	Unit	Rate	Subtotal	Total
Signage – Regulatory, distance markers, interpretive signage, directional signage		**Item**		150,000	150,000

150,000

Bins

Description	Quantity	Unit	Rate	Subtotal	Total
Allowance for bins at key entry points only – general waste/recycling including concrete pads	5	**No**	4,000.00	20,000	20,000

20,000

Seating

Description	Quantity	Unit	Rate	Subtotal	Total
Seating along track - assumed every 800 metres	50	No	1,500.00	75,000	75,000

75,000

Picnic tables

Description	Quantity	Unit	Rate	Subtotal	Total
Picnic tables	7	**No**	6,000.00	42,000	42,000

42,000

Shelters

Description	Quantity	Unit	Rate	Subtotal	Total
Shelters	7	**No**	25,000.00	175,000	175,000

175,000

Toilets

Description	Quantity	Unit	Rate	Subtotal	Total
Pit toilets. One at Rossmoyne Park, one at the northern reach and along Colac-Ballarat Road.	3	**No**	35,000.00	105,000	105,000

105,000

Habitat enhancement planting

Description	Quantity	Unit	Rate	Subtotal	Total
Allow for establishment of indigenous tufting, groundcover, tree and shrub planting at key habitat areas.	1	No	50,000.00	50,000	50,000
					50,000

Option - Armco barriers and roadside shoulder adjustments (if path along Colac-Ballarat Road is pursued)

Description	Quantity	Unit	Rate	Subtotal	Factor	Total
Armco barriers/railing to roadside locations	8,800	m	325.00	2,860,000	1.1500	3,289,000
Roadside shoulder adjustments - Provisional	8,800	m	250.00	2,200,000	1.1500	2,530,000
Contingency		Item		181,000		181,000
				5,241,000		**6,000,000**

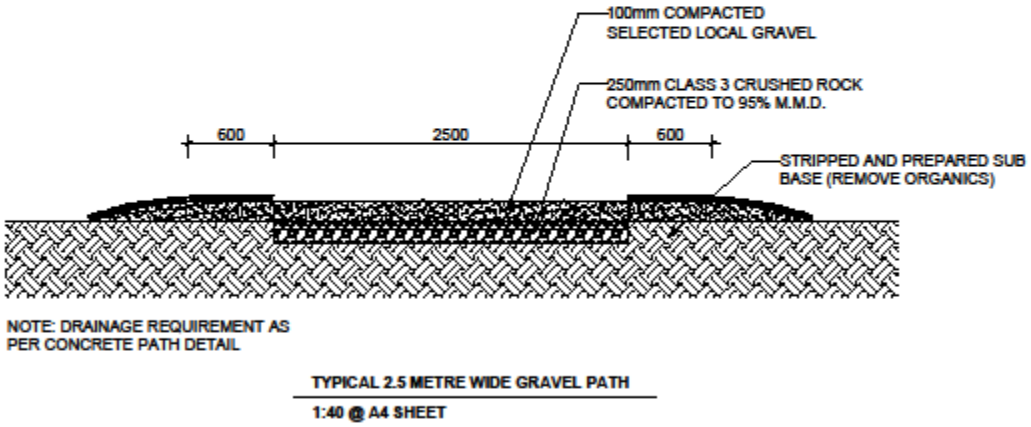
Option - 1800 high PVC coated fencing with 3 strands of barbed wire (extra over cost)

Description	Quantity	Unit	Rate	Subtotal	Factor	Total
1800 high black PVC coated chainwire mesh fencing with three strands of barbed wire, footings, gates as required	39,180	m	160.00	6,268,800	1.1500	7,209,120
DEDUCT Farm fencing between pathway and adjacent land - 1800 high barbed wire fences, gates as required	39,180	m	-50.00	-1,959,000	1.1500	-2,252,850
Contingency		Item		43,730		43,730
				4,353,530		**5,000,000**

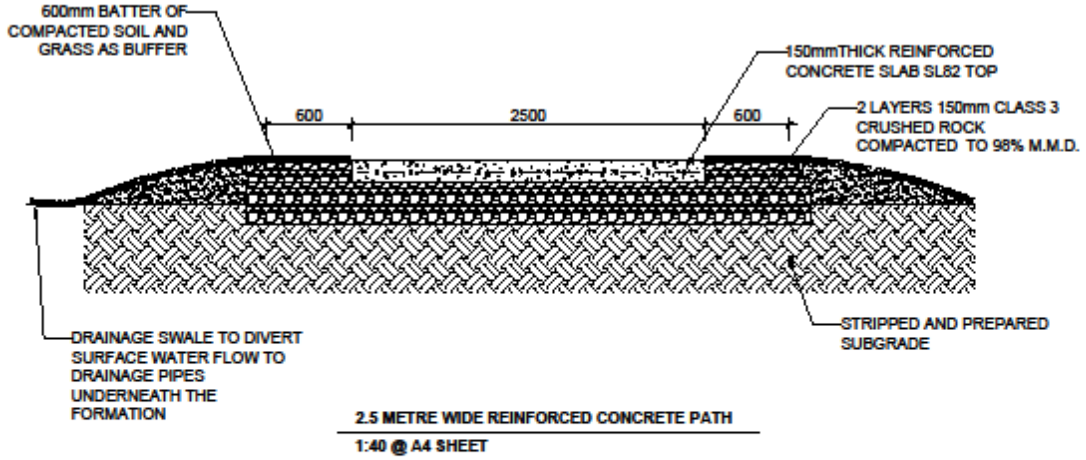
Annual maintenance costs - average annual cost for first 10 years

Description	Quantity	Unit	Rate	Subtotal	Total
Gravel - minor patching - assume 10% per year, spray weeds	9,350	m2	10.00	93,500	93,500
Boardwalk - Inspections, minor repairs		Item		2,500	2,500
Fencing repairs		Item		10,000	10,000
Swales - General cleaning, maintenance	38,780	m	1.00	38,780	38,780
Clean up rubbish	39,180	m	0.20	7,836	7,836
Car parks - gravel repairs, cleaning		Item		2,000	2,000
Signage - cleaning, minor replacements		Item		5,000	5,000
Bins - weekly emptying of bins - 5 bins @ $150 per week	52	weeks	150.00	7,800	7,800
Toilets, shelters, picnic tables - weekly cleaning at $200 per week	52	weeks	200.00	10,400	10,400
Annual cleaning of drainage pipes	70	No	150.00	10,500	10,500
Sundries		Item		1,684	1,684
					190,000

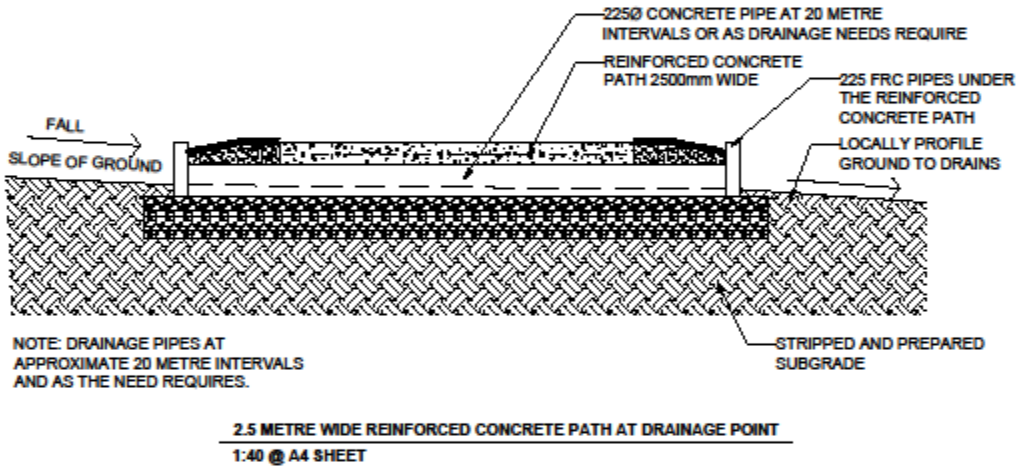
Appendix G – Proposed trail path sections



For most of the trail's length a compacted selected local gravel will be used. It will be slightly raised above the surrounding surface.



To low lying sections and sections close to the lake's edge, a stable surface of reinforced concrete is proposed.



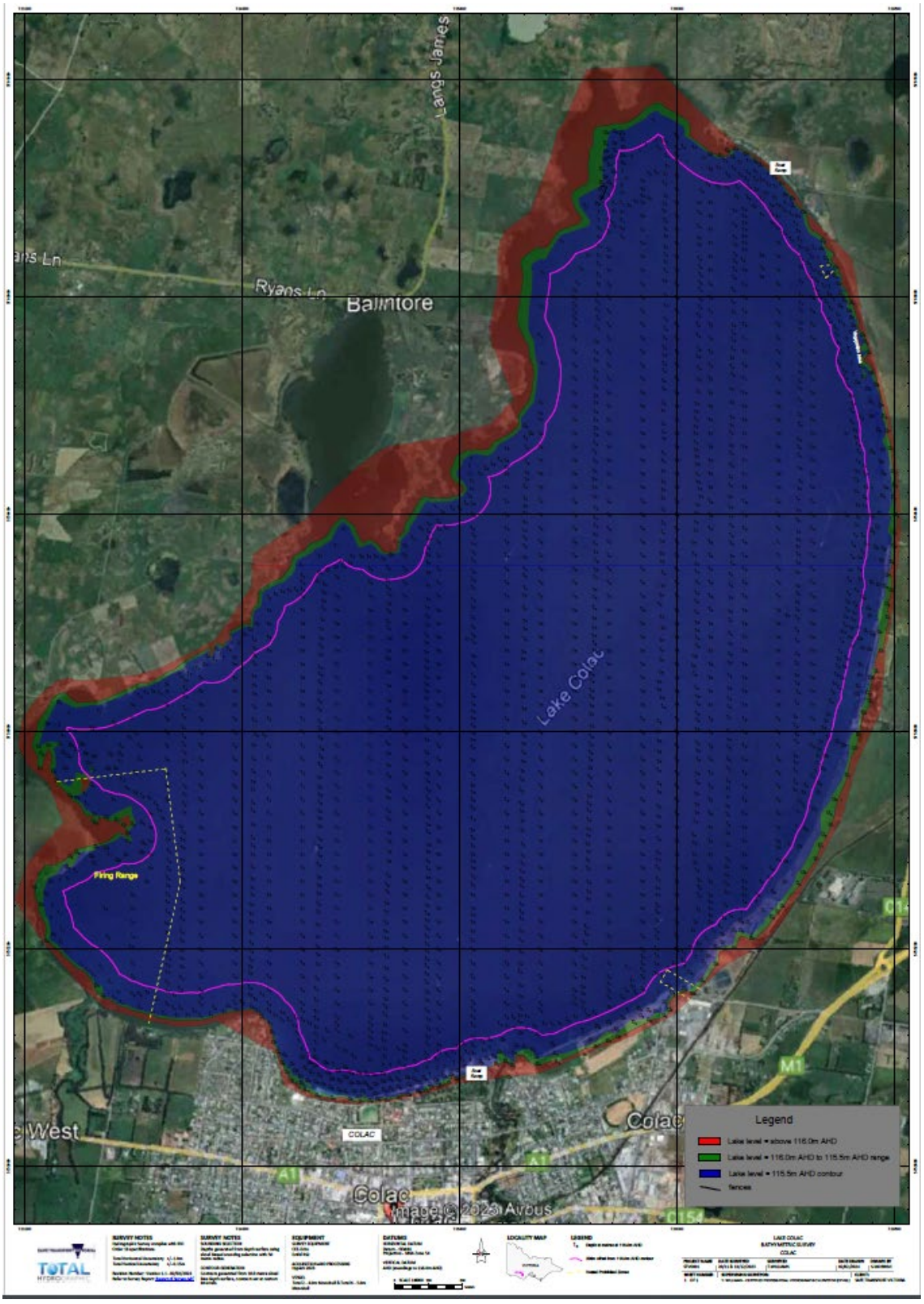
To low lying sections with a crossfall of the trail close to the lake's edge a stable surface of reinforced concrete is proposed. To poorly drained sections, concrete pipes will be laid beneath the trail profile to facilitate drainage water to move through the zone.

Appendix H– Visualisations

Lake Colac Proposed Perimeter Path North of Meredith Park

Lake Colac Proposed Perimeter Path South of Rossmoyne Park

Appendix I – Safe Transport Victoria Plan of Survey – Lake Colac



Appendix J – The Eastern Edge of Lake Colac

Meredith Park to the Barwon Water Treatment Plant – A distance of approximately 6.8 kilometres

Introduction

This assessment is based on drone footage undertaken by Colac Otway Shire for the section of the lake of approximately 6.8 kilometres from Meredith Park Road and the Barwon Water Treatment Plant on Treatment Works Road and Flaxmill Road. Two inspections in the field were made, one at the end of Irrewarra School Road and the second from a farm property south of Irrewarra School Road. The eastern edge has a range of site conditions from flat beach - like edges towards Meredith Park, earthen embankments in the middle section, to low cliff faces of rock ledges to the southern end close to the sale yards and the Barwon Water Treatment Plant.

The assessment is based on several parameters to construct a trail that will provide unrestricted public use access, privacy for adjacent property owners and protection of a really vulnerable slope and embankments subject to south westerly and north westerly wind driven waves at times of high water levels to the lake. It is important to note, that there is no Crown land left to the eastern side of the lake. All Crown land has eroded away since European settlement and designation of Crown land. This is in contrast to the western edge of the lake which was a significant width of designated Crown land to which a trail can be established as a combination of mainly gravel, some concrete sections and some boardwalk sections.

Parameters and Conditions

(a) Where the existing embankments need to be cut to reduce the angle of repose, it should be subject to geotechnical review of the specific soil and rock conditions to confirm batter angles and extent of cut. Batter slopes created will require revegetation with native and indigenous plant species.

(b) The future trail should be at least 0.6 -1.2 metres above the high water level of the lake, this will provide all-weather access and mitigate the extent of erosion. Wherever possible the trail formation will be against the toe of existing embankments. Where basalt rock beaching is placed to the lake edge, there may be a deposited layer of silt which will not be suitable for founding, and locally sourced basalt rocks will need to be placed below this level on competent rock or natural clay strata (all subject to review by a qualified Geotechnical Engineer prior to design).

(c) Rock beaching of local basalt rock and concrete slurry revetment walls or beaching needs to be constructed to the majority of the foreshore length to minimise erosion to the high water mark.

(d) Beaching and rockwork needs to be founded on solid base material beneath the intended trail route. From the drone footage, the solid base grounding forming a rock causeway is required, particularly between Meredith Park Road and just north of the Irrewarra School Road easement.

(e) A section lake's foreshore south of the Irrewarra School Road easement where there are distinct vehicle tracks and the most elevated tracks above water level are assumed suitable for use for the trail.

(f) The newly created rock causeway will form the basis of a progressive construction access platform to enable trucks, machinery and dump trucks access to enable trimming of vertical embankments, placement of basalt rocks and concrete trucks to enter and exit.

(g) Toward the Irrewarra School Road easement near vertical embankment slopes and some rockwork beaching is evident on the field inspection and drone footage. The existing embankment slope needs to be cut back by machinery to a 35° slope and planted with indigenous and nativeplants to minimise erosion of the embankment and potential collapse of rock and soil onto the trail. Land acquisition of approximately 6-7 metres of farmland will be necessary for a considerable length in the middle area of approximately 2.5 kilometres.

(h) From approximately 2.5-3 kilometres south of Meredith Park Road the trail can follow existing 4WD tracks as long as above the high water level. Midway to the Saleyards the Barwon Water Treatment Plant there is a length of exposed existing embankments and length of embankment and rock beaching at the base of the embankments. It is intended most of the existing rocks can be re- used as the base for the corridor with significant amounts of additional local basalt rock beaching added above the high water level of 0.6 – 1.2 metres to minimise erosion. Concrete slurry should be poured between rocks to secure rocks and minimise undermining of the toe of the slope, the constructed platform and the causeway.

(i) Close to the Saleyards and the Barwon Water Treatment Plant the earthen embankments change to small exposed rock caves and low cliff faces, including recently dislodged rocks lying at the toe of the cliff. Where the trail is adjacent to the cliffs, the soil conditions will need extensive review, as it isclear that there is ongoing collapse of the low cliff line. The trail will need to be kept far enoughaway that trail users will not be at risk due to slip or falling rocks. Strong low fencing or cement stabilisation (subject to geotechnical advice) to prevent minor dislodgement and rock fall will be necessary in these areas to provide protection for trail users from collapsing rocks. Rock beaching of either local basalt rock on the sedimentary or metamorphic orange/brown coloured rockwork (to match if available from other local sources which is probably unlikely).

The Opinion of Probable Costs includes the planning and approval studies that will be required to plan and design the construction of an on grade trail between Meredith Park to the Barwon Water Treatment Plant, a total distance of approximately 6.8 kilometres.

- Geotechnical field testing and reporting
- Hydrological investigation
- Cultural Heritage investigation
- Flora and Fauna investigation
- Feature and Levels Survey, including Boundary Establishment
- Planning and Approval i.e. EPBC, FFG, COSC and Barwon Water
- Design and Delivery
- Consultation and engagement with property owners and government agencies and COSC
- Project Management by COSC

Calculations

There will be several regimes of construction and land management to the eastern side of the lake.

A: Rocks placed to replace soft silt along the foreshore and to raise the trail above the lake's waterlevel. Meredith Park Road to 1000 lineal metres south of Meredith Park Road (distance of 1000 lineal metres).

To include:

- Preparation of base rock material to replace soft silt where required - $600 per lineal metre
- Excavation and disposal - $850 per lineal metre
- Rock beaching and slurry - $850 per lineal metre
- Geotextile fabric - $100 per lineal metre
- Fill material - $500 per lineal metre
- Concrete path - $750 per lineal metre
- Contingency (15%) - $550 per lineal metre

TOTAL ESTIMATED COST PER METRE $4,200 PER LINEAL METRE

Regime A = 1000 lineal metres X $4,200

= $4,200,000

B: Assume stable base to support the concrete base trail and rocks to raise above the lake's waterlevel. Commencing from 1000 lineal metres south of Meredith Park Road to 2300 lineal metres south of Meredith Park Road (distance of 1300 lineal metres).

To include:

- Excavation and disposal - $850 per lineal metre
- Rock beaching and slurry - $850 per lineal metre
- Geotextile fabric - $100 per lineal metre
- Fill material - $500 per lineal metre
- Concrete path - $750 per lineal metre
- Contingency (15%) - $450 per lineal metre

TOTAL ESTIMATED COST PER METRE $3,500 PER LINEAL METRE

Regime B = 1300 lineal metres X $3,500

= $4,550,000

C: Assume stable base to support the concrete base trail and rocks to raise above the lake's waterlevel. Existing embankments cut to 35 degrees and planted with appropriate indigenous and native plants. Commencing approximately 2300 lineal metres south of Meredith Park Road to 3900lineal metres south of Meredith Park Road, and 4250 lineal metres south of Meredith Park Road to 5100 lineal metres south of Meredith Park Road, and 5270 lineal metres south of Meredith Park Road to 5620 lineal metres south of Meredith Park Road (distance of 2800 lineal metres).

To include:

- Rock beaching and slurry - $850 per lineal metre
- Geotextile fabric - $100 per lineal metre
- Fill material - $500 per lineal metre
- Concrete path - $750 per lineal metre
- Embankment shaping where required - $600 per lineal metre
- Planting to cut embankments and mesh to hold mulch and planting - $300 per lineal metre
- Contingency (15%) - $465 per lineal metre

TOTAL ESTIMATED COST PER METRE $3,565 PER LINEAL METRE

Regime C = 2800 lineal metres X $3,565

= $9,982,000

D: Existing vehicular tracks, assume tracks are above the lake's high water level. Concrete base and vegetation. Assume stable base, no rock work required. 3900 lineal metres south of MeredithPark Road to 4250 lineal metres south of Meredith Park Road (distance of 350 lineal metres).

To include:

- Fill material - $300 per lineal metre
- Concrete path - $750 per lineal metre
- Contingency (15%) - $155 per lineal metre

TOTAL ESTIMATED COST PER METRE $1,205 PER LINEAL METRE

Regime D = 350 lineal metres X $1,205

= $421,750

E: Existing rocks to be re-used, add additional locally sourced basalt rocks and concrete path base. Assume stable base. 5100 lineal metres south of Meredith Park Road to 5270 lineal metres south ofMeredith Park Road (distance of 170 lineal metres).

To include:

- Rock beaching and slurry - $850 per lineal metre
- Geotextile fabric - $100 per lineal metre
- Fill material - $500 per lineal metre
- Concrete path - $750 per lineal metre
- Embankment shaping where required - $600 per lineal metre
- Contingency (15%) - $420 per lineal metre

TOTAL ESTIMATED COST PER METRE $3,220 PER LINEAL METRE

Regime E = 170 lineal metres X $3,220

= $547,400

F: Protective fencing to stop rocks injuring trail users and wire grid netting to the most vulnerable sections of eroded metamorphic rock cliff. Additional metamorphic or locally sourced basalt rocksto prevent undermining and erosion by wave action of the cliff face. 5620 lineal metres south of Meredith Park Road to 6800 lineal metres south of Meredith Park Road (distance of 1180 lineal metres).

To include:

- Rock beaching and slurry - $850 per lineal metre
- Geotextile fabric - $100 per lineal metre
- Fill material - $200 per lineal metre
- Concrete path - $750 per lineal metre
- Minor embankment and stabilisation - $300 per lineal metre
- Wire netting across the embankment - $200 per lineal metre
- Rigid barrier fence to prevent users being injured by falling rocks - $300 per lineal metre
- Contingency (15%) - $405 per lineal metre

TOTAL ESTIMATED COST PER METRE $3,105 PER LINEAL METRE

Regime F = 1180 lineal metres X $3,105

= $3,663,900

TOTAL SUM OF TRACK CONSTRUCTION REGIMES A, B, C, D,E AND F TO THE EASTERN SIDEOF THE LAKE = $23,365,050

BACKGROUND STUDIES AND FEES

- Geotechnical Field Testing and Reporting - $30,000
- Hydrological Investigation and Report- $30,000
- Cultural Heritage Investigation - $234,207
- Flora and Fauna Investigation - $25,000
- Feature and Levels Survey - $80,000
- Boundary Establishment - $40,000
- Planning and Approvals i.e. EPBC, FFG, COSC and Barwon Water - $40,000
- Planning and Design Consultants - $190,000
- Consultation and Engagement with Property Owners and Government Agencies and COSC -$15,000
- Project Management by COSC during the Research, Planning Design and Construction - $100,000
- Land acquisition - $1,000,000

TOTAL SUM OF BACKGROUND STUDIES AND FEES TO THE EASTERN SIDE OF THELAKE = $1,784,207

SUMMARY:

Background Studies and Fees of the Eastern Side of the Lake= $1,784,207Construction of the Eastern Side of the Lake = $23,365,050

Total sum of the Eastern Edge of Lake Colac = $25,149,257

The following drone slides of the drone flyover undertaken by Council have been calibrated to aerial photography. A detailed feature and levels survey as part of the future planning and detailed design process will provide accurate locations of the entire foreshore.

1. Lough Calvert Drain Area – Approx. 625m South of Meredith Park Road

2. Jetty – Approx. 1,370m South of Meredith Park Road

3. Double Row of Trees – Approx. 2,215m South of Meredith Park Road

4. Flat Land North of Irrewarra School Road – Approx. 2,300m South of Meredith Park Road

5. Windbreak Planting Right Angles – Approx. 2,880m South of Meredith Park Road

6. Irrewarra School Road – Approx. 3,160m South of Meredith Park Road

7. Vehicular Tracks to an Extensive Mid-Section South of Irrewarra School Road – Approx. 4,020m South of Meredith Park Road

8. Approx. 4,255m South of Meredith Park Road

9. Embankment into Rock Beaching and Embankment – Approx. 5,100m South of Meredith Park

10. End of Rock Walling and Embankment North of the Sale Yards – Approx. 5,270m South ofMeredith Park Road

11. Embankment Adjacent to Sale Yards – Approx. 5,620m South of Meredith Park Road

12. Rock Embankment South of the Sale Yards – Approx. 5765m South of Meredith Park Road